Offshore Information for Area Contingency Planning

Gulf of Mexico

Offshore Oil and Gas Infrastructure

Technical Document #1

May 2022

Record of Changes

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8				
9				
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Table of Contents

Tables

Figures

1 Introduction

In 2019, the Bureau of Safety and Environmental Enforcement (BSEE) sponsored a project in cooperation with the United States Coast Guard (USCG) to improve the content of the coastal zone area contingency plans (ACPs) with respect to the information necessary to effectively plan for and respond to large oil spills from offshore oil and gas facilities. This collaboration between BSEE, USCG District Eight, resource trustees, state agencies, oil spill removal organizations (OSROs), and Area Committees resulted in a series of technical documents that provide offshore information for the Gulf of Mexico (GOM) on:

- **Oil and Gas Infrastructure (GOM Technical Document #1)**
- Worst Case Discharge Scenarios (GOM Technical Document #2 and Appendices 2A-F)
- Response Concept of Operations (GOM Technical Document #3)
- Response Strategies and BMPs (GOM Technical Document #4)
- Sensitive Species Profiles (GOM Technical Document #5)

These documents were developed specifically for incorporation by reference into the coastal zone ACPs and are hosted on the BSEE Oil Spill Preparedness Division's (OSPD) website. In addition to the above technical documents, an inventory of offshore spill response equipment and a set of offshore Environmental Sensitivity Indices (ESI) maps were created and embedded in NOAA's Environmental Response Management Application (ERMA). Collectively, these materials provide a foundation of risk assessment, resources at risk, and conceptual response information to inform coastal zone ACP planning and responses to a significant offshore facility oil spill incident.

1.1 Technical Document #1 Contents

Offshore Oil and Gas Infrastructure (GOM Technical Document #1) provides information on:

- The geology of the Northern GOM Basin;
- The oil and gas infrastructure, including leases, platforms, wells, and offshore pipelines, present in the GOM; and
- The oil products stored and handled at the offshore oil and gas facilities and transported through pipelines that may potentially spill.

Information in this document is presented by shallow or deepwater (as defined in Section 3.1.1) and by the Area Contingency Plan (ACP) Planning Areas and Captain of the Port (COTP) Zones in the GOM. These areas, shown in Figure 1, are:

- South Texas Coastal Zone (Corpus Christi)
- Central Texas Coastal (Houston-Galveston)
- Southeast Texas and Southwest Louisiana (Port Arthur)
- South-central Louisiana (Houma)
- Southeast Louisiana (New Orleans)
- Alabama, Mississippi, and Northwest Florida (Mobile)
- West Central Florida (St. Petersburg)
- Florida Keys (Key West)

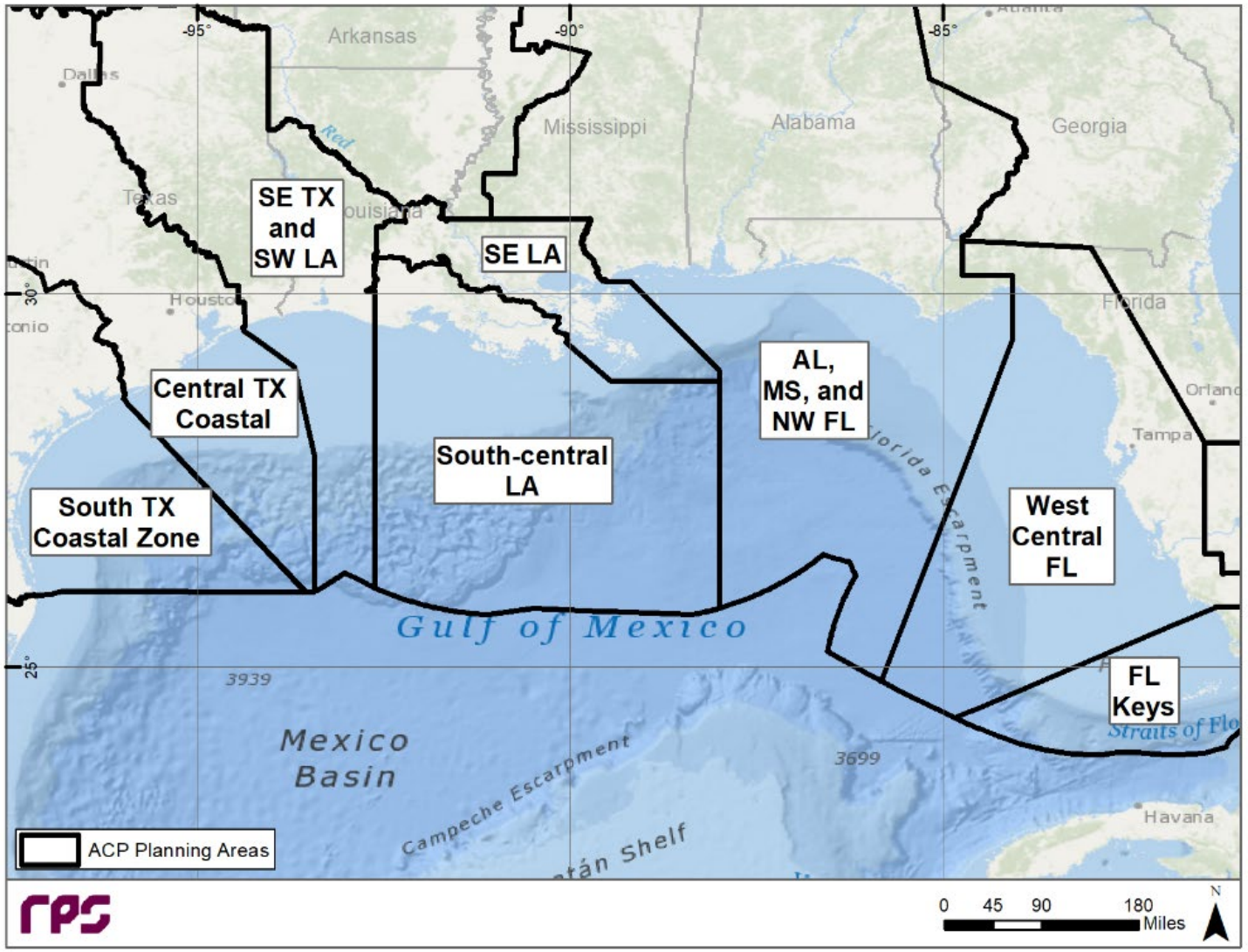

Figure 1. ACP Planning Areas in the GOM.

2 Description of the Northern GOM

2.1 Description of the Northern GOM Basin

The GOM Basin is a major petroleum province that has been an active oil and gas source for more than 100 years. The GOM is one of the longest-lived, most active, productive, complex, and successful basins in North America. Stretching from South Texas to Alabama and from the coastal plain across the continental shelf to the continental slope, oil and gas fields produced over 5.5 billion barrels of oil and 13.8 billion mcf of natural gas between 2010 and 2019. During 2020, over 621 million barrels of oil and over 1 billion mcf of gas were produced.

The GOM attracts a wide array of domestic and international exploration and production companies to the diverse basin. Oil and gas companies target both highly mature provinces along the coastal plain and continental shelf all the way to new frontier plays in ultra-deepwater and in high temperature/high pressure reservoirs.

2.2 Geologic Features of the Northern GOM

"The most notable geologic feature in the northwestern GOM is the uniquely rough seafloor surface north of the Sigsbee Escarpment, which is conspicuous in bathymetric maps of the basin (Figure 2). This widespread deformation is a result of the upward migration and then dissolution of the deep salt deposits noted below. Under very high pressures created by thick layers of overlying terrigenous sediment, salt deforms plastically (like modeling clay) and moves laterally as well as upward toward the seafloor in ridges and pillars known as diapirs. At locations where these salt diapirs breach the seafloor and contact seawater, they gradually dissolve, producing the complex irregular collapse features seen in seafloor bathymetry as well as "pools" and "rivers" of highly concentrated saltwater brine." [1]

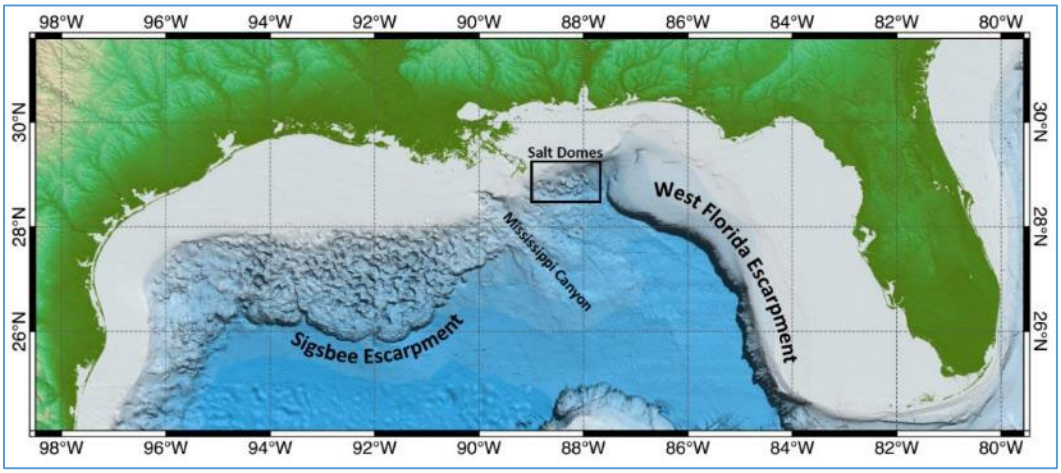

Figure 2. Bathymetric Map of Northern GOM Showing Major Geologic Features[2].

[1] https://oceanexplorer.noaa.gov/okeanos/explorations/ex1803/background/geology/welcome.html
[2] Source: NOAA Ocean Exploration and Research. https://oceanexplorer.noaa.gov/okeanos/explorations/ex1803/background/geology/welcome.html

"Additionally, as salt diapirs cut upward through overlying terrigenous sediment, they create vertical pathways for the movement of hydrocarbons (oil and natural gas) along their edges. When these hydrocarbons emerge at the seafloor, they create 'cold seep' environments including asphalt seeps, mud volcanoes, and gas seeps, which often harbor unique chemosynthetic ecosystems.

The Sigsbee Escarpment along the southern edge of this salt complex is cut by a number of undersea canyons, including Perdido, Alaminos, Keathley, Bryant, Cortés, Farnella, and Green Canyons, which serve as pathways for downslope movement of sediment into the deeper central GOM. The steep walls of these canyons often have outcrops of exposed rock, free of sediment cover, which provide necessary hard substrate habitat for sessile organisms including many species of deep-sea coral and sponge."[3]

2.3 Bathymetry of the Northern GOM

The Northern GOM includes a shallower shelf area along the coast as well as much deeper areas (up to 12,000 feet) further offshore as shown in Figure 3.

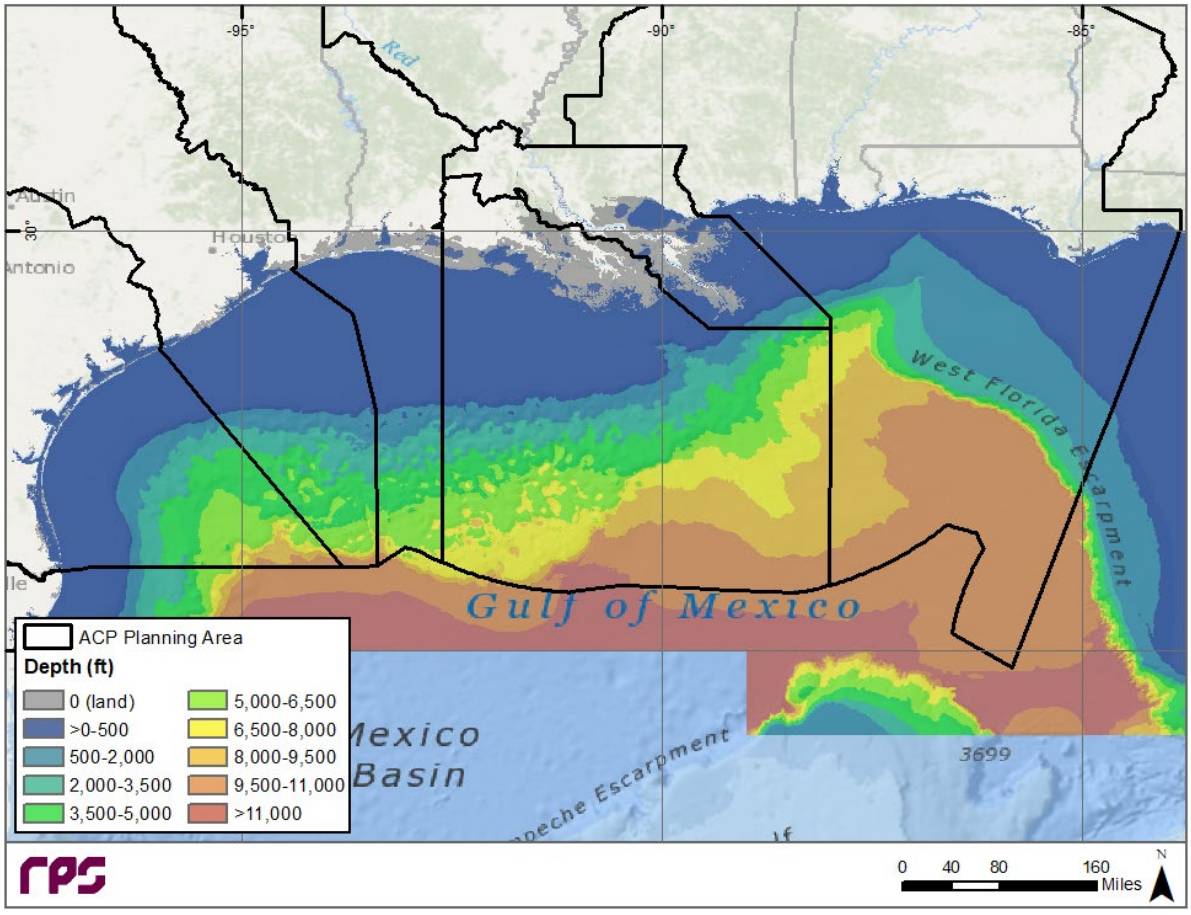

Figure 3. Bathymetry of Northern GOM.

[3] https://oceanexplorer.noaa.gov/okeanos/explorations/ex1803/background/geology/welcome.html

3 Northern GOM Oil and Gas Infrastructure

3.1 Description of Oil and Gas Infrastructure

3.1.1 Key Definitions

- Area and Block: An Area is a named geographic region that corresponds to an Official Protraction Diagram (OPD). A standard OPD is 1 degree in latitude by 2 degrees in longitude (at lower latitudes: 0 - 48 degrees) as in the GOM. The OPDs are numbered using the United Nations International Map of the World Numbering System, however, OPDs are commonly referred to by name rather than number. The name usually refers to a topographic feature found within the Area (e.g., Mississippi Canyon). A Block is an administrative subdivision of the Area used for leasing or regulatory purposes, usually a square 3 miles by 3 miles. It is referred to by number or a combination of letters and a number. (e.g., Mississippi Canyon Area, Block 778, or MC 778). Protraction areas (and their letter designators) in Region 6 include:
  - Alaminos Canyon (AC)
  - Amery Terrace (AM)
  - Apalachicola (AP)
  - Atwater Valley (AT)
  - Bay Marchand (BM)
  - Brazos (BA)*
  - Breton Sound (BS)
  - Chandeleur (CA)
  - Chandeleur Sound (CS)
  - Corpus Christi (CC)
  - Desoto Canyon (DC)
  - Destin Dome (DD)
  - East Breaks (EB)
  - East Cameron (EC)
  - The Elbow (EL)
  - Eugene Island (EI)
  - Ewing Bank (EW)
  - Florida Middle Ground (FM)
  - Florida Plain
  - Gainesville (GV)
  - Galveston (GA)*
  - Garden Banks (GB)
  - Grand Isle (GI)
  - Henderson (HE)
  - Howell Hook (HH)
  - Green Canyon (GC)
  - High Island (HI)*
  - Keathley Canyon (KC)
  - Lloyd Ridge (LL)
  - Lund (LU)
  - Lund South (LS)
  - Main Pass (MP)
  - Matagorda Island (MI)
  - Mississippi Canyon (MC)
  - Mobile (MO)
  - Mustang Island (MU)*
  - North Padre Island (PN)*
  - Pensacola (PE)
  - Port Isabel (PI)
  - Sabine Pass – Tx (SX)
  - Sabine Pass – La (SA)
  - Ship Shoal (SS)
  - Sigsbee Escarpment (SE)
  - South Marsh Island (SM)
  - South Padre Island (PS)*
  - South Pass (SP)
  - South Pelto (PL)
  - South Timbalier (ST)
  - Vermilion (VR)
  - Vernon Basin (VB)
  - Viosca Knoll (VK)
  - Walker Ridge (WR)
  - West Cameron (WC)
  - West Delta (WD)

* Protractions off Texas with Addition Areas would add the letter "A" at the end of the letter designator.

- Bbl: standard unit for measuring volume of crude oil, equal to 42 US gallons.
- Deepwater: Although there are several definitions of "deepwater," for the purpose of this document, activities occurring in water depths over 500 feet are considered deepwater activities. (Activities that take place in less than 500 feet are referred to as "Shelf" activities.)
- Drilling rig: A drilling rig is an apparatus used to drill oil and gas wells. It may also be used for other downhole operations, such as well interventions. It may be mobile (see Mobile Offshore Drilling Unit below) or attached to a fixed or floating platform.
- Lease: A grant by the Bureau of Ocean Energy Management (BOEM) to one or more parties of exclusive rights to a specific area located on the Outer Continental Shelf (see below) for the purpose of exploring for, developing, and producing oil and gas.
- mcf: standard unit for measuring volume of natural gas, equal to one thousand cubic feet. (1 billion mcf = 1 trillion cubic feet of gas)
- Mobile Offshore Drilling Unit (MODU): A mobile offshore drilling unit is a floating or floatable drilling rig. Figure 4 shows examples of mobile offshore drilling units.
- Offshore supply vessel: An offshore supply or service vessel brings supplies and personnel to offshore platforms.
- Outer Continental Shelf (OCS): The Outer Continental Shelf Lands Act (OCSLA), created on August 7, 1953, defines the OCS as all submerged lands lying seaward of state coastal waters which are under U.S. jurisdiction (i.e., those within 200 miles of the coastline).
- Pipeline: A pipeline is a steel pipe with pumps, valves, and control devices used to transport oil, gas, water, etc. A pipeline that is used to connect a single wellhead to a manifold or platform within a field is often called a flowline.
- Platform: A platform is an offshore structure used to support oil and gas drilling, development, and production activities. A fixed platform is a permanent structure that consists of a jacket (a tall vertical section made of tubular steel members supported by piles driven into the seabed) with a deck placed on top, providing working space that may include such things as crew quarters, one or more drilling rigs, and production and processing facilities. A floating platform is a structure that is not fixed to the ocean floor but floats and is usually attached to the ocean floor with anchors and chains. It could also be held in place through dynamic positioning with thrusters that automatically adjust to counter the effects of ocean currents. Figure 5 shows examples of different types of platforms.
- Right-of-Way (ROW): Right-of-Way (ROW) means an authorization issued by BSEE under the authority of section 5(e) of the OCSLA (43 U.S.C. 1334(e)) for the use of submerged lands of the Outer Continental Shelf for pipeline purposes. Pipelines contained within one or more leases with the same owner/operator are known as lease-term pipelines. Pipelines laid outside those boundaries (on other leased or unleased areas) require a Right-of-Way.
- Shallow: Water depths of 500 feet or less.

- Shelf: The continental shelf is the shallower area adjacent to the coastline. The water depth is generally 500 feet or less.
- Sidetracks: An additional well drilled from an existing borehole to a new geologic target, or a new location within the original target, by cutting through the side of the existing casing and drilling a new borehole. A bypass is a well drilled using the same method as a sidetrack to get around a mechanical problem in the original borehole to reach the original target.
- Well: A well is a hole drilled into the Earth for the purpose of extracting oil and/or gas from a petroleum reservoir. It may also be called a borehole. A well drilled to determine if a petroleum reservoir can be economically produced is known as an exploration well. A well that has been fully cased with steel pipe and is used to extract oil and/or gas is a production well. Most production wells are located beneath or immediately adjacent to a platform. A production well not located beneath or adjacent to a platform is known as a subsea well.

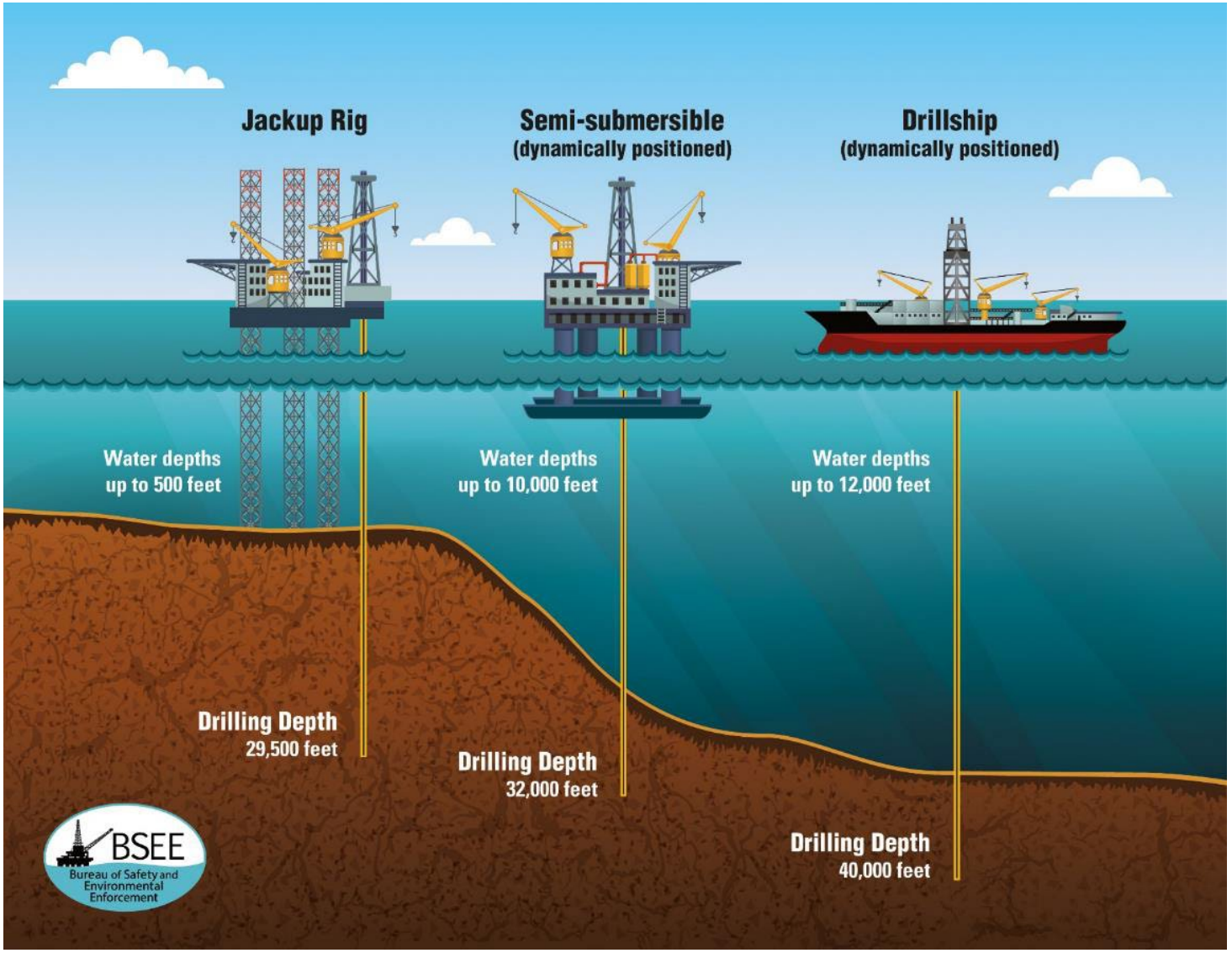

Figure 4. Types of Mobile Offshore Drilling Units.

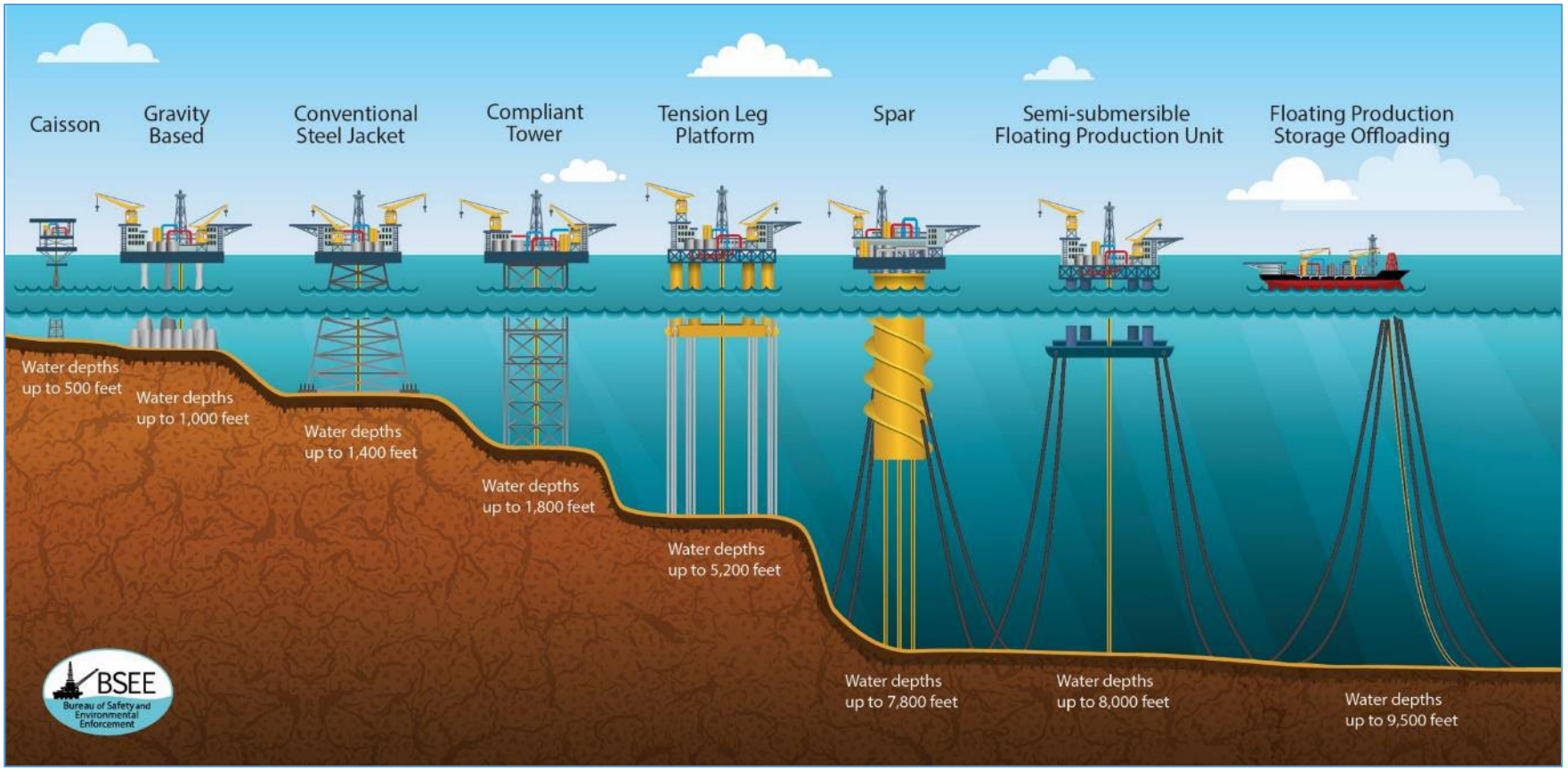

Figure 5. Examples of Production Platforms[4].

[4] Source: Bureau of Safety and Environmental Enforcement *Examples of Production Platforms 2020.*

3.2 Active OCS Lease Areas

Oil and gas exploration and production activities in OCS waters are conducted by leasing through the Bureau of Ocean Energy Management (BOEM) leasing policy and program. The active OCS oil and gas leases and BOEM protraction areas from the OPD in the Northern GOM are shown in Figure 6.

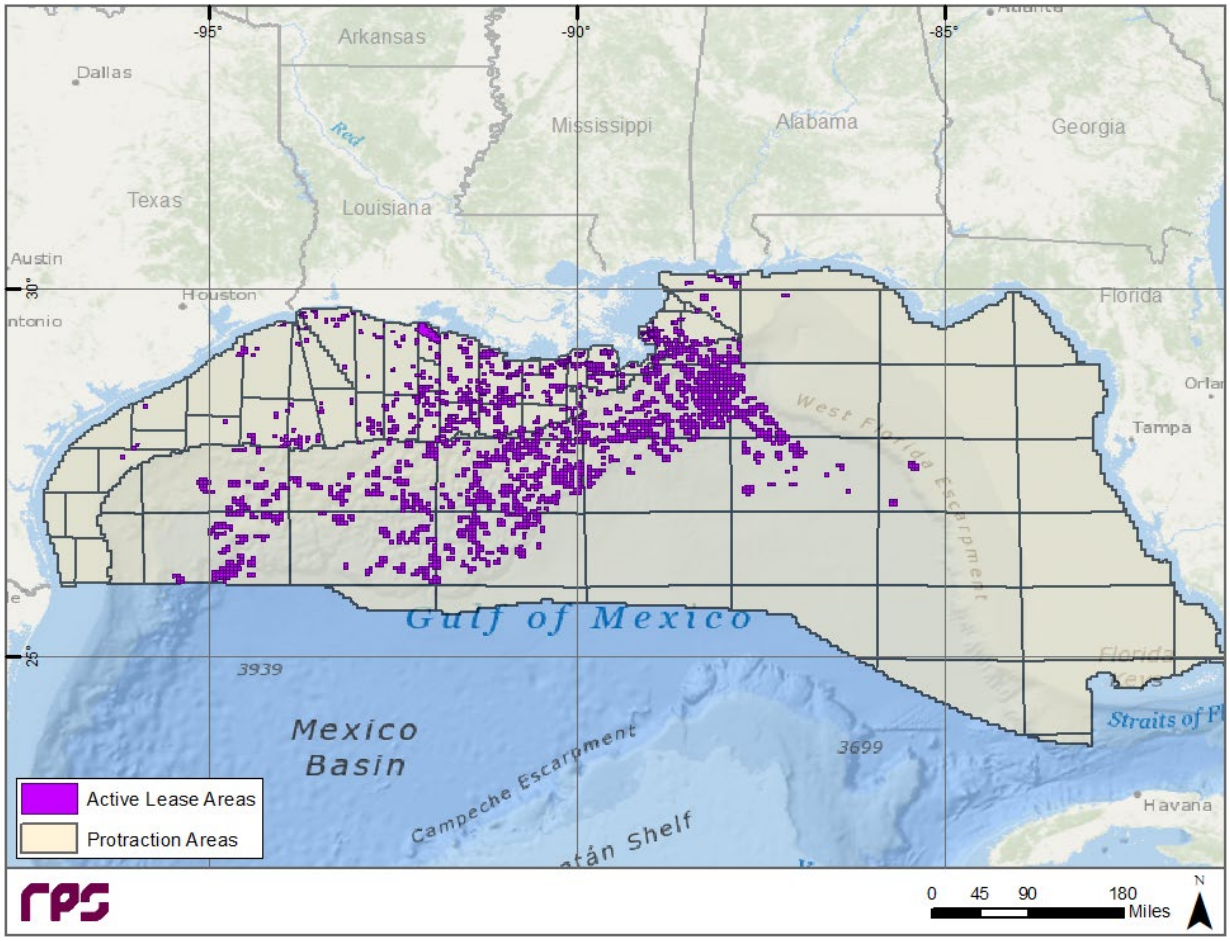

Figure 6. Active OCS Lease Areas in the Northern GOM.

3.3 OCS Platforms and Wells

Note: While there are many offshore wells and platforms in state waters seaward of the coastline throughout the GOM, the data and figures in this document, both at the regional and individual ACP area level are based on the wells and platforms in OCS waters only.

3.3.1 Wells in Northern GOM

There are over 37,000 wells in the Northern (US) GOM. About 90% of the wells are in shallower waters (≤500 feet deep) on the Shelf. The numbers of wells in the entire Northern GOM by water depth and well status are summarized in Table 1. The numbers of wells by status and ACP Planning

Area are shown in Table 2. The locations of active wells are shown in Figure 7, which include all wells except those that are sidetracks or are permanently abandoned.

Table 1. Numbers of OCS Wells in Northern GOM by Well Status.

Location Depth	Well Status[5]		Total
	Active Wells	Permanently Abandoned	
Shallow	7,382	26,271	33,653
Deepwater	1,474	1,993	3,467
Total	8,856	28,264	37,120

Table 2. Numbers of OCS Wells in Northern GOM by Well Status and ACP Planning Area.

ACP Planning Area/Depth	Well Status[6]		Total
	Active Wells	Permanently Abandoned	
South Texas Shallow	54	1,061	1,115
South Texas Deepwater	56	42	98
South Texas Total	110	1,103	1,213
Central Texas Shallow	121	1,730	1,851
Central Texas Deepwater	79	180	259
Central Texas Total	200	1,910	2,110
SE TX and SW LA Shallow	605	4,835	5,440
SE TX and SW LA Deepwater	0	5	5
SE TX and SW LA Total	605	4,840	5,445
South-central LA Shallow	5,547	16,821	22,368
South-central LA Deepwater	1,214	1,603	2,817
South-central LA Total	6,761	18,424	25,185
Southeast LA Shallow	987	1,526	2,513
Southeast LA Deepwater	0	1	1
Southeast LA Total	987	1,527	2,514
AL, MS, and NW FL Shallow	68	289	357
AL, MS, and NW FL Deep	125	162	287

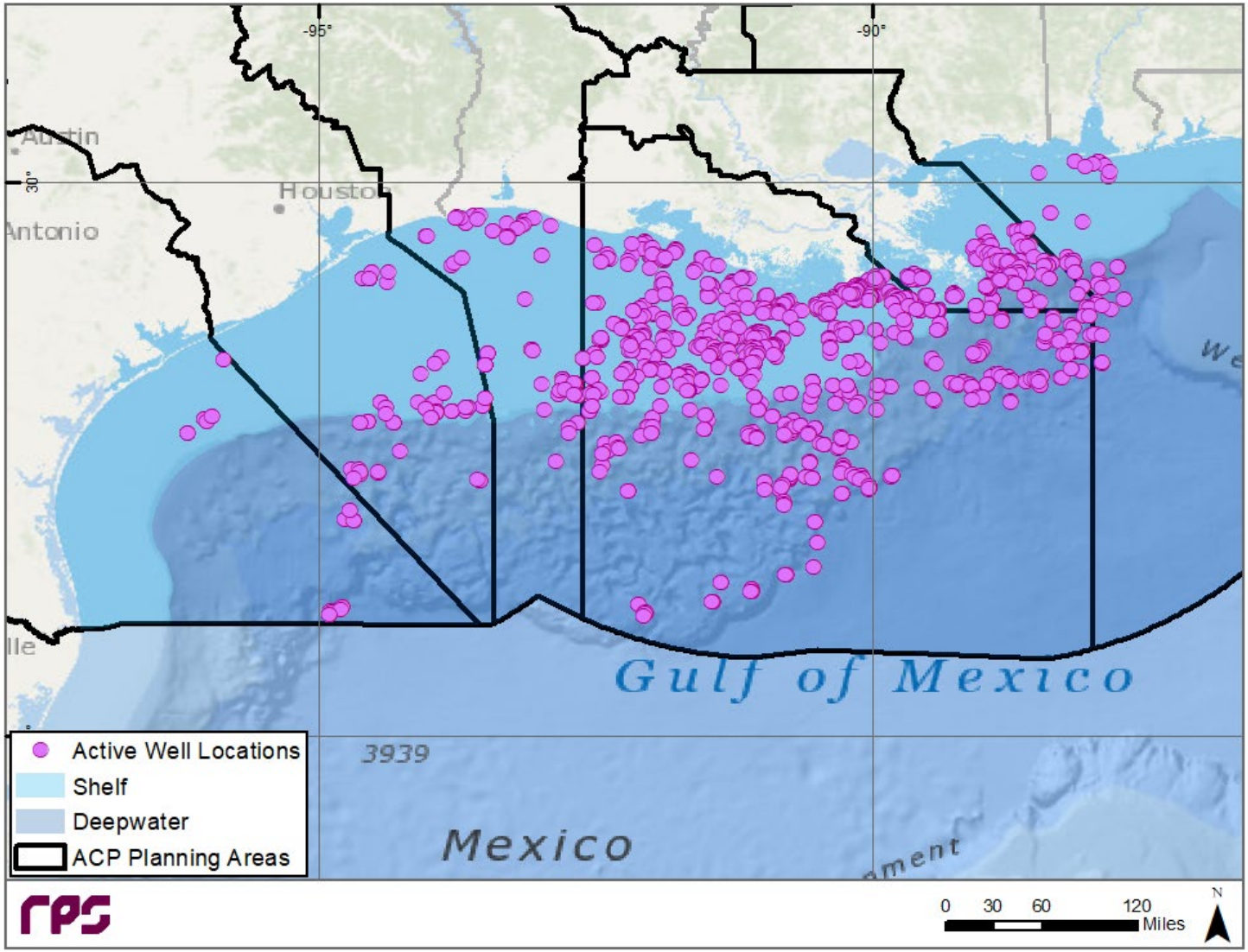

Figure 7. Active OCS Wells in the Northern GOM.

3.3.2 OCS Platforms in Northern GOM

Platforms in the Northern GOM produce a number of commodities – oil (crude oil), condensate (ultra-light hydrocarbon liquids that initially exist in a gaseous state but have liquefied (or condensed) due to changes in temperature or pressure), and gas. Platforms commonly produce two or more of these commodities at the same time; the mix of the commodities produced at a platform will change over time, and the characteristics of the commodities will also change. There are also a small number of platforms near the mouth of the Mississippi River that produce sour crude oil (oil containing hydrogen sulfide or H2S). There are 1,676 platforms in the Northern GOM (as of 30 November 2020). 42% of the platforms in the gulf produce oil, but only 10%produce crude oil exclusively.

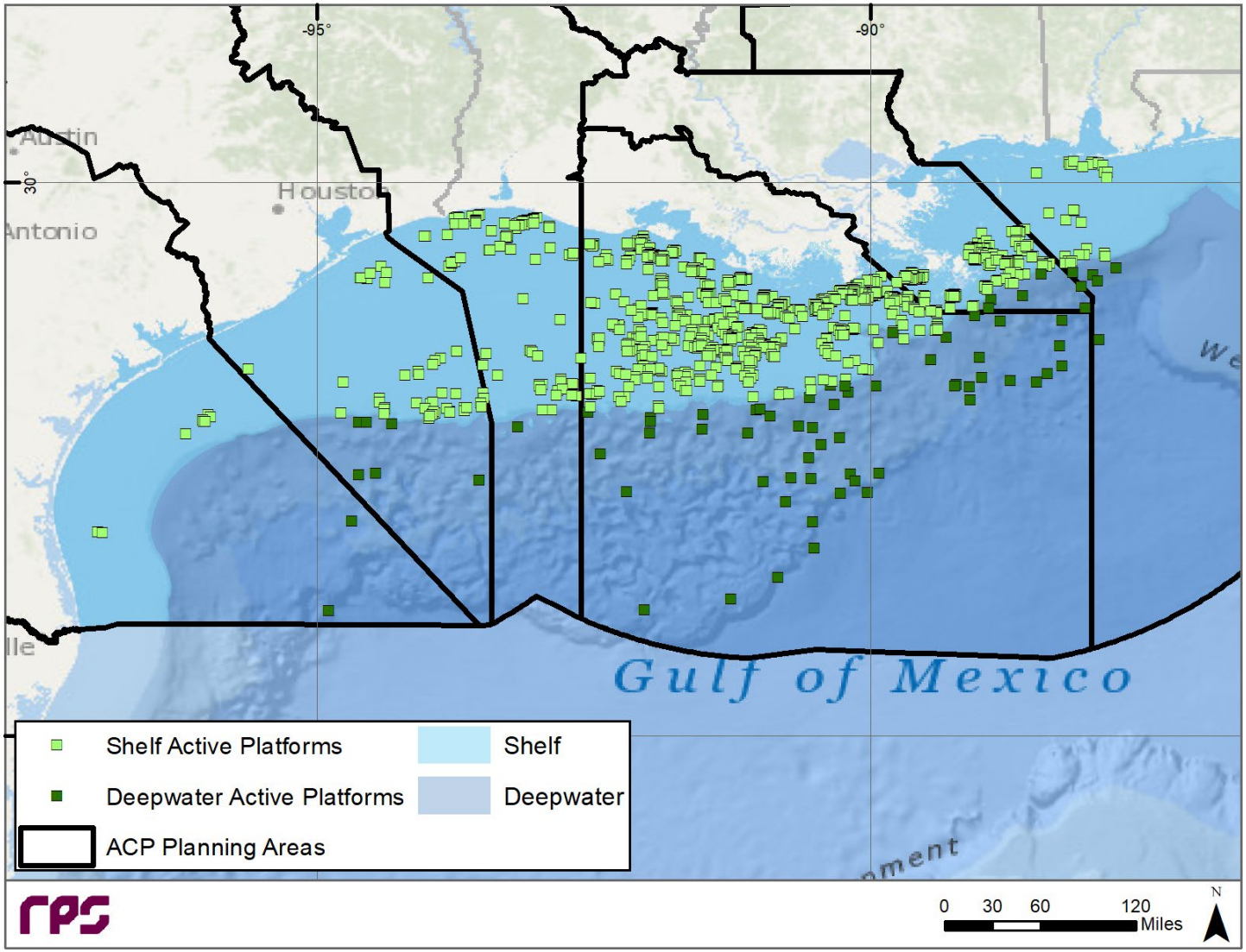

Figure 8. Active OCS Platforms in the Northern GOM.

3.3.3 Well Age

The oil and gas wells in the Northern GOM differ significantly with respect to age in shallow (shelf) waters (Table 3) and deep waters (Table 4).

Table 3. Age Categories of Shallow Wells in the Northern GOM by Well Status.

Well Status[7]	Total Wells (by Age)			Total
	< 20 years	20–50 years	> 50 years	
Active Wells	1,878	4,555	949	**7,382**
Permanently Abandoned	2,009	16,518	7,744	**26,271**
Total Wells	**3,887**	**21,073**	**8,693**	**33,653**

Table 4. Age Categories of Deepwater Wells in the Northern GOM by Well Status.

Well Status[8]	Total Wells (by Age)			Total
	< 20 years	20–50 years	> 50 years	
Active Wells	**966**	508	0	**1,474**
Permanently Abandoned	**701**	1,291	1	**1,993**
Total Wells	**1,667**	**1,799**	**1**	**3,467**

3.4 Offshore ROW Pipelines

The Northern GOM contains over 15,600 miles of active oil and gas pipelines (Table 5). About 45% of the pipelines transport oil, 47% transport gas, and the remainder transport condensate or a combination of products. Pipeline product types are based on BSEE categorizations and the products carried in a pipeline may change over time.

3.4.1 ROW Pipeline Locations Across Northern GOM

The locations of offshore ROW pipelines in the Northern GOM are shown in Figure 9. To avoid cluttering the figure, lease term pipelines, which are pipelines contained within a single lease or a group of leases, are not shown. Examples of lease term pipelines are lines that connect between platforms or tie platforms into ROW pipelines.

3.4.2 Pipeline Age

Determining the age of the pipe used in a pipeline is difficult. Any section of pipe in a pipeline can be reused from an older pipeline or replaced with a newer section of pipe. Multiple pipeline routes can be combined or modified with segments of pipe that vary in age. About 56% of the active pipeline mileage in the Northern GOM is at least 20 years old. About 25% is 40 years or older.

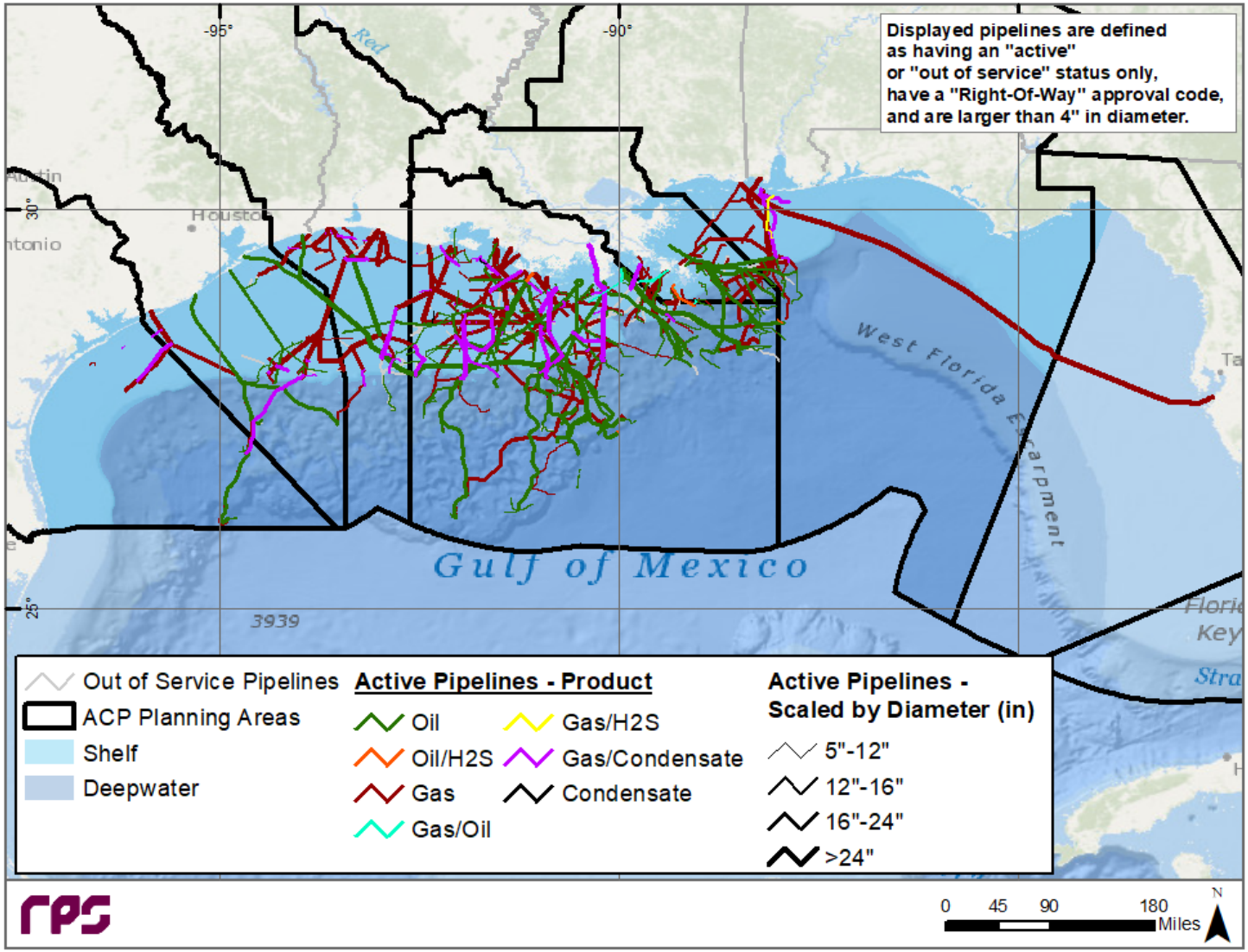

Figure 9. Active Offshore ROW Pipelines in the Northern GOM.

3.5 OCS Oil and Gas Production

Each year, nearly 622 million bbl of oil and over 1 billion mcf of gas are produced. Most of the oil (over 90%) is produced in the deepwater areas. Most of the gas (over 60%) is also produced in the deepwater areas. Over 86% of the oil and over 83% of the gas produced in the Northern GOM is produced in the South-central Louisiana ACP Planning Area.

There is considerable variation in the amount of oil and gas production by individual wells in the Northern GOM. The highest-producing oil well produces over 5 million bbl of oil per year. The lowest-producing wells produce less than 10 bbl per year. The highest-producing gas wells produce over 7.1 billion cubic feet of gas annually.

For leases, each may contain numerous wells and platforms. The highest-producing oil and gas leases are shown in Table 5 and Table 6. The highest-producing leases are shown in Figure 10.

NOTE: The oil and gas production data used throughout this report is from the time period between October 31, 2019 – November 30, 2020. These figures include data listed in Table 5, Table 6, and Figure 10 below, as well as each of the corresponding "lease production" Tables and Figures in each of the ACP-specific sections.

Table 5. Highest-Producing Oil Leases in Northern GOM.[5]

Lease Number	ACP	Area-Block	Depth Category	Annual Production	
				Oil + Condensate (bbl)	Gas in Same Lease (mcf)
G14658	South-central Louisiana	MC822	Deepwater	29,536,775	20,867,776
G20082	South-central Louisiana	GC640	Deepwater	27,212,580	15,416,310
G15607	South-central Louisiana	GC743	Deepwater	24,737,579	17,653,095
G21245	South-central Louisiana	WR678	Deepwater	21,721,320	5,304,966
G07962	South-central Louisiana	MC806	Deepwater	20,563,001	26,665,061
00310	South-central Louisiana	Multiple[10]	Shallow	18,643,428	180,112,428
G07963	South-central Louisiana	MC807	Deepwater	17,920,667	19,942,858
G15610	South-central Louisiana	GC782	Deepwater	15,266,789	4,133,683
G17565	South Texas Coastal Zone	AC857	Deepwater	12,516,914	16,711,567
G26253	AL, MS, and NW FL	MC392	Deepwater	12,047,261	7,472,141

[5] Based on BSEE data for 31 October 2019–30 November 2020.

Table 6. Highest-Producing Gas Leases in Northern GOM.

Lease Number	ACP	Area-Block	Depth Category	Annual Production	
				Gas (mcf)	Oil + Condensate in Same Lease (bbl)
00310	South-central Louisiana	Multiple[11]	Shallow	180,112,428	18,643,428
G07962	South-central Louisiana	MC806	Deepwater	26,665,061	20,563,001
G09216	South-central Louisiana	GB215	Deepwater	23,640,064	6,729,113
G10350	South-central Louisiana	GB386	Deepwater	22,007,531	3,005,866
G14658	South-central Louisiana	MC822	Deepwater	20,867,776	29,536,775
G07963	South-central Louisiana	MC807	Deepwater	19,942,858	17,920,667
G15607	South-central Louisiana	GC743	Deepwater	17,653,095	24,737,579
G34460	South-central Louisiana	MC811	Deepwater	17,337,889	7,219,060
G07493	South-central Louisiana	GB427	Deepwater	16,834,267	2,984,173
G25098	South-central Louisiana	MC546	Deepwater	16,799,250	3,512,651

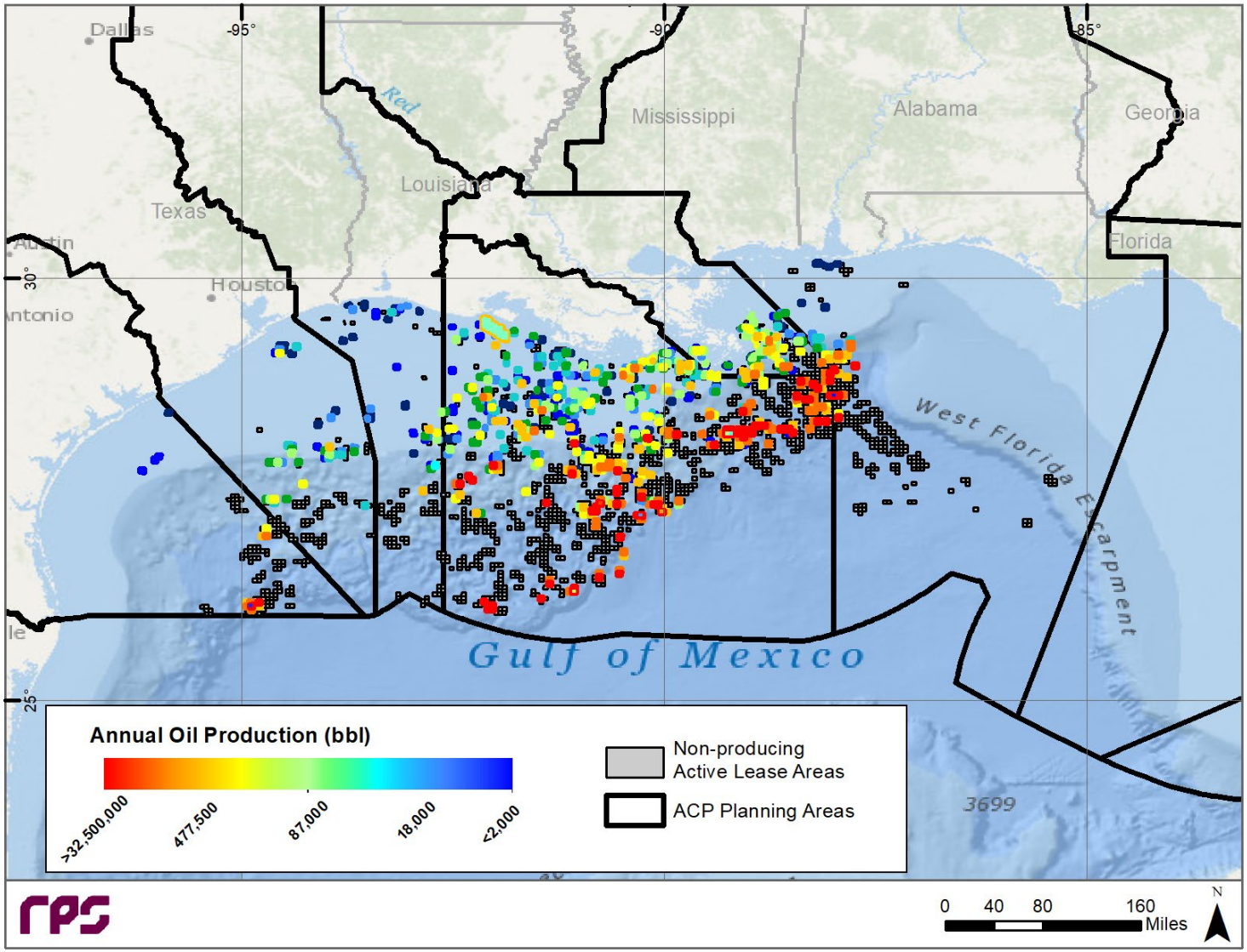

Figure 10. Highest-Producing OCS Leases in Northern GOM.

3.6 Additional Information Resources for Offshore Infrastructure

3.6.1 OCS Waters

Additional up-to-date information on OCS infrastructure can be obtained from the online BSEE Data Center at https://www.data.bsee.gov or by contacting the BSEE representative on the Area Committee or Regional Response Team. Figure 11 shows an example of platform data from the BSEE Data Center.

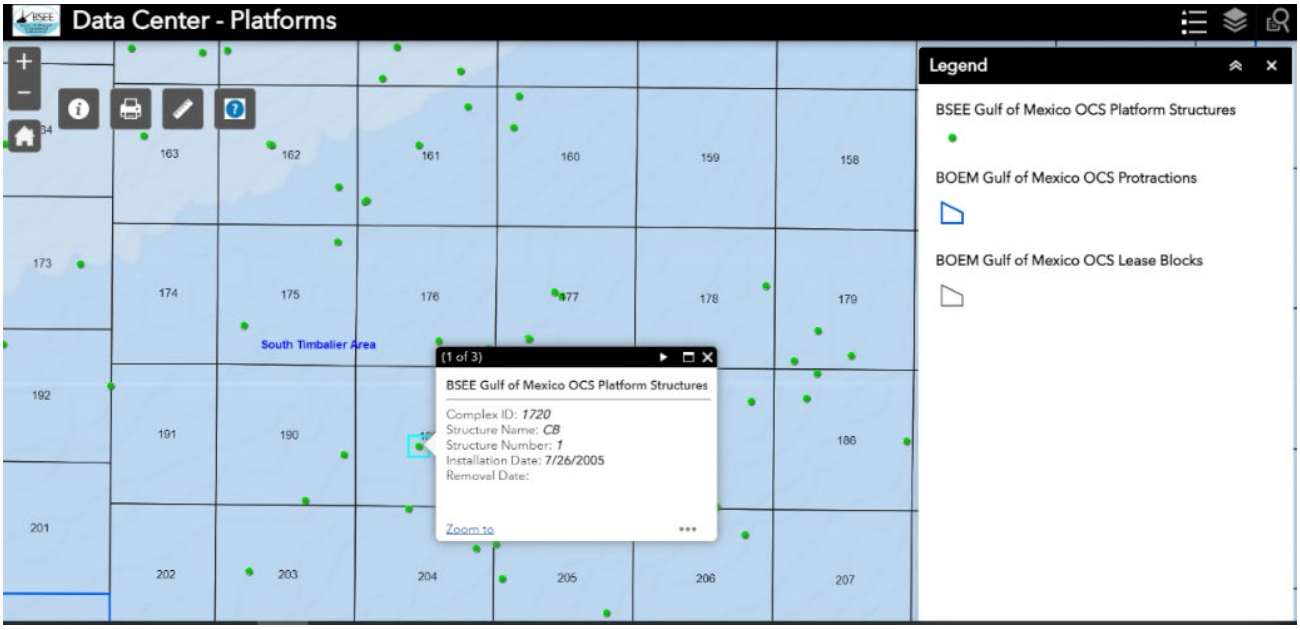

Figure 11. Example data from the BSEE Data Center (https://www.data.bsee.gov).

NOAA's Environmental Response Management Application (ERMA) also contains data on offshore infrastructure that can be viewed under "Public Safety and Infrastructure/Oil and Gas" layers. ERMA can be accessed at https://response.restoration.noaa.gov/resources/maps-and-spatial-data/environmental-response-management-application-erma. Figure 12 shows offshore infrastructure data displayed in ERMA in the South Texas Coastal Zone ACP Planning Area.

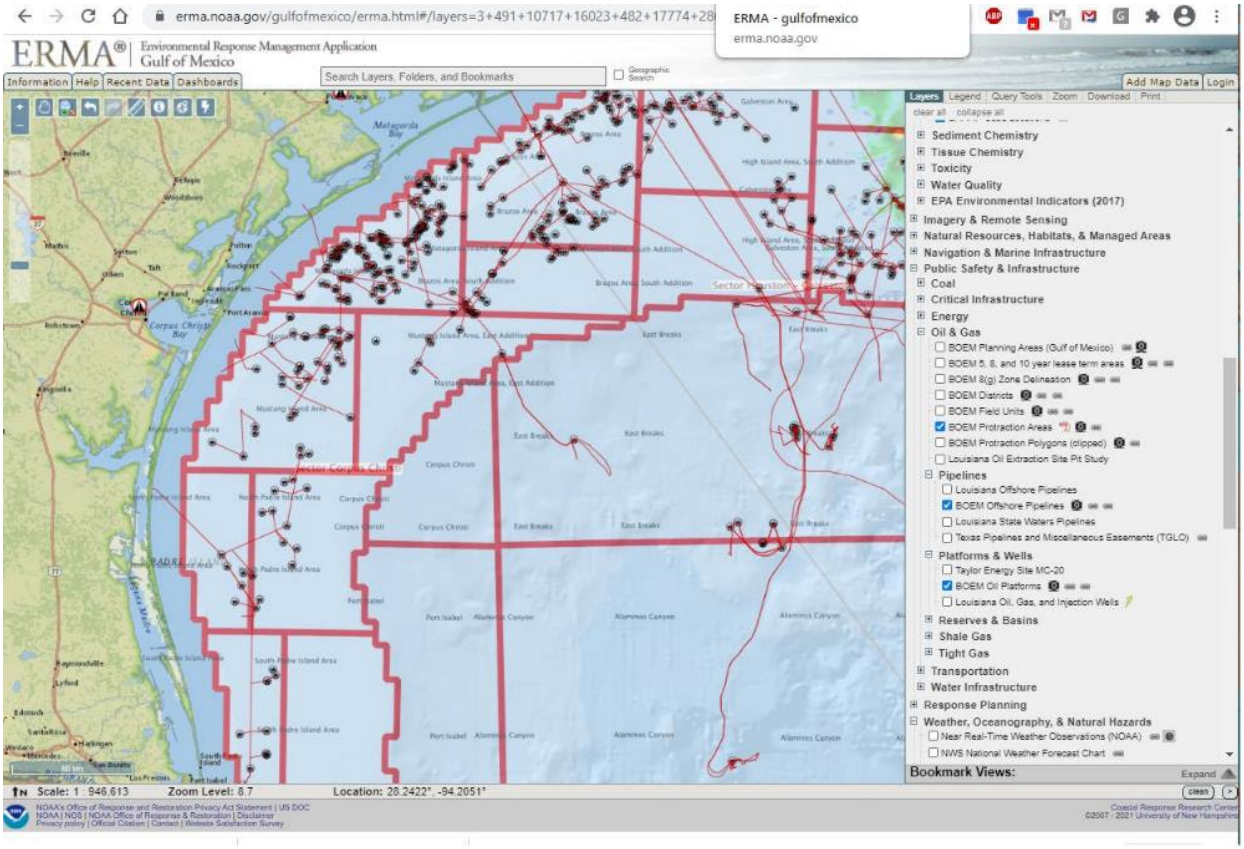

Figure 12. Offshore infrastructure layers near the South TX Coastal Zone.

Displayed in NOAA ERMA (https://response.restoration.noaa.gov/resources/maps-and-spatial-data/environmental-response-management-application-erma).

3.6.2 State Waters

Additional information can be found on offshore infrastructure in state waters at the following state websites:

3.6.2.1 Texas

The locations of offshore oil and gas structures, pipelines, and submerged tracts in Texas state waters can be viewed in the Oil Spill Response Mapper via the "Offshore Structures Inventory" layer on the Texas General Land Office website https://gisweb.glo.texas.gov/ostoolkit/index.html.

3.6.2.2 Louisiana

In the SONRIS GIS viewer, accessed from the Louisiana Department of Natural Resources website, layers may be turned on in the Table of Contents for "Oil and Gas Wells" and "Louisiana Offshore Blocks" to view the well locations in state waters and submerged tract designations. There are also layers for "BOEM platforms" and "BOEM pipelines" that extends information into state waters. This site can be accessed at http://sonris-www.dnr.state.la.us/gis/agsweb/IE/JSViewer/index.html?TemplateID=181.

3.6.2.3 Mississippi

A lease block map for the state of Mississippi waters can be downloaded from the Mississippi Office of Geology website at http://geology.deq.ms.gov/coastal/infomaps-leaseblock.htm. The location of any wells in Mississippi state waters can be viewed in the Mississippi Oil and Gas Board (MSOGB) Data Explorer at https://ws.ogb.state.ms.us/MSOGBOnline/.

3.6.2.4 Alabama

Offshore oil and gas infrastructure and the state submerged tracts in Alabama waters can be viewed in the Alabama Oil and Gas Board (OGB) Maps viewer via the "Well", "Offshore Structures", "Offshore Pipelines" and "Alabama Lease Blocks" layers at: https://www.ogb.state.al.us/apps/maps/. A database of wells can also be viewed at https://www.ogb.state.al.us/ogb/wells

3.7 Oil Products in the GOM

A variety of oil types may potentially discharge from offshore oil and gas operations in the Northern GOM – including crude oils and crude condensates from wells and pipelines, as well as fuels, lubricating oils, and hydraulic oils used on platforms, offshore supply vessels, drilling rigs, and mobile offshore drilling units.

Oils differ considerably in their properties based on their composition and the degree of weathering after discharging. Crude oils are composed of a mixture of many different types of hydrocarbons – from light, volatile compounds, such as benzene, toluene, ethylbenzene, and xylene (BTEX), to heavier compounds, such as asphaltenes. Refined petroleum products made from crude oils, such as gasoline, diesel fuel, and heavy fuel oil, exhibit different properties as well.

3.7.1 API Gravity (Oil Density)

The most commonly referenced oil property is its density. Oil density can be expressed in two ways: specific gravity or °API gravity.

Specific gravity is the ratio of the density of oil relative to water. The density of freshwater is 1.0 while the density of salt water (seawater) is 1.02 to 1.03, depending on the temperature. At colder temperatures, sea water is slightly denser. Oil is generally lighter than water (with a density of less than 1.0) which means that it floats on water. The lighter the oil, the lower the density or specific gravity value.

°API gravity is a measure developed by the American Petroleum Institute (API) to represent how light or heavy an oil is compared to water. °API gravity is an inverse measure, meaning the higher the number, the lighter the oil. Heavier oils have lower °API gravities.

The density of oil increases with weathering (evaporation of volatile hydrocarbon components) and decreasing temperature. The density of oil affects its buoyancy. An increase in the oil density increases the possibility of the oil sinking. Oil will sink if its density is higher than that of the water. It will also sink when it comes in contact with sediment, other particles, or debris that make the mixture heavier than water. Sunken oil presents challenges for spill response.

Oil density also affects the rate of natural dispersion with lighter oils dispersing more readily. Lighter oils also spread faster on the water surface in the early stages of a spill.

3.7.2 Lowest °API Gravity and Heaviest Oil Group in GOM

The lowest °API gravity oil (i.e., the heaviest oil) in the Northern GOM has an °API gravity of 10, which is classified as a Group IV oil.

3.8 Other Oil Products Handled in Offshore Oil and Gas Operations

Offshore oil and gas operations include the use of various types of oils, such as fuels and lubricants for platform and drilling rig or mobile offshore drilling unit operations, as well as fuels and lubricants for the offshore supply or service vessels that bring supplies to the offshore facilities. The most commonly encountered oils include hydraulic fluids, diesel fuel, and drilling muds.

3.8.1 Synthetic-Based Drilling Muds (SBMs)

Synthetic-based drilling muds (SBMs) are often used during drilling of deep water and directional wells. The EPA prohibits the routine discharge of synthetic-based drilling muds and oil-based drilling muds and cuttings. SBMs almost completely replaced oil-based muds, which are very rarely used in the GOM at this point in time. Both SBMs and cuttings mixed with the muds can be accidentally discharged.

SBMs are generally comprised of 30–90% by volume (20–50% by weight) of synthetic organic compounds (which act as lubricants), that are dispersed in a salt brine to form an emulsion, along with other ingredients including emulsifiers, wetting agents, a weighting material (usually barite, $BaSO_4$, or ilmenite, $FeTiO_3$), clays, lignite, and lime. They are much denser than seawater. SBMs are synthesized specifically to not include PAHs, thus resulting in less environmental impact and lower toxicity for workers.

3.8.2 Diesel Fuel

Diesel fuel, a Group II oil, is commonly used on offshore platforms and in vessels. This product is the only type of non-crude petroleum that would be found in significant quantities in a single container (> 1,000 bbl). When spilled, diesel fuel will evaporate, dissolve, and naturally disperse to some extent. Diesel fuel includes moderate concentrations of toxic, soluble compounds. These components tend to evaporate (often more than 50%), but they can also leave residues that persist in the environment for days to weeks.

3.8.3 Hydraulic Fluids

Hydraulic fluids or oils are used on both vessels and on offshore platforms. Based on density, hydraulic oils range from Group II to Group IV, depending on their specific formulation and application. They are usually found in relatively small quantities.

3.8.4 Lubricants

Lubricating oils (lubricants) are also used on both vessels and offshore platforms. Based on density, lubricants range from Group II to Group IV, depending on their specific formulation and application. They are also usually found in relatively small quantities.

4 South Texas Coastal Zone (Corpus Christi)

4.1 Oil and Gas Fields

The westernmost ACP Planning Area in the GOM, South Texas Coastal Zone (Corpus Christi) contains a natural gas-bearing area in which, excluding the rare exception in Mustang Island, one sees solely gas fields. The only portion of this area containing oil fields is found in the deepwater regions of the southernmost East Breaks and Alaminos Canyon. Nearly half of the fields contain structural traps associated with faulted anticlinal features, while the other half is equally divided between normal fault traps and rollover structures into growth faults. Hydrocarbon-bearing sands were identified between 700 and 22,500 feet subsea.

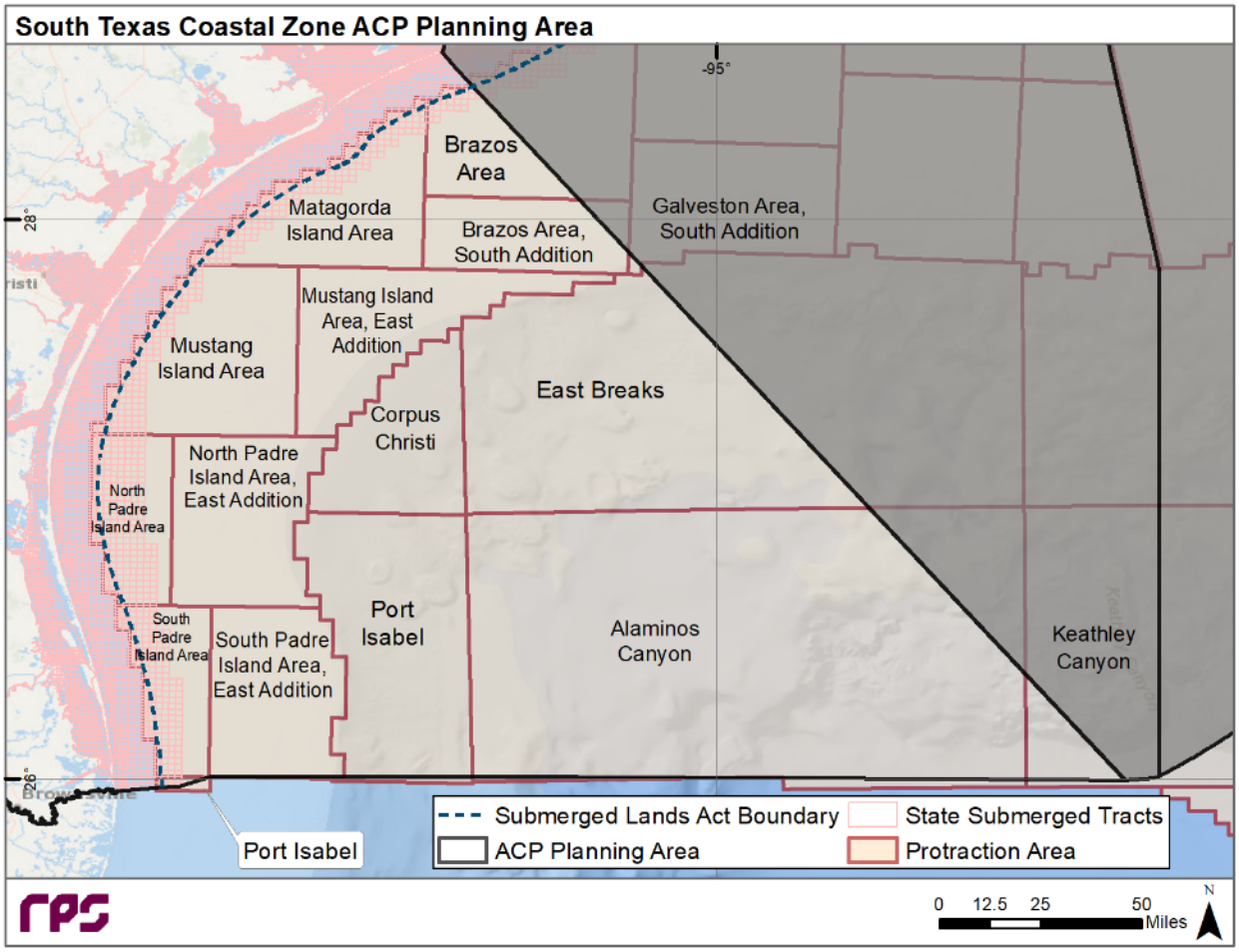

Figure 13. Protraction Areas in the South Texas Coastal Zone ACP Planning Area.

(Note: Lease blocks in TX waters are referred to as "GOM Tract Number XX" and are sequentially numbered from north to south).

4.2 Bathymetry

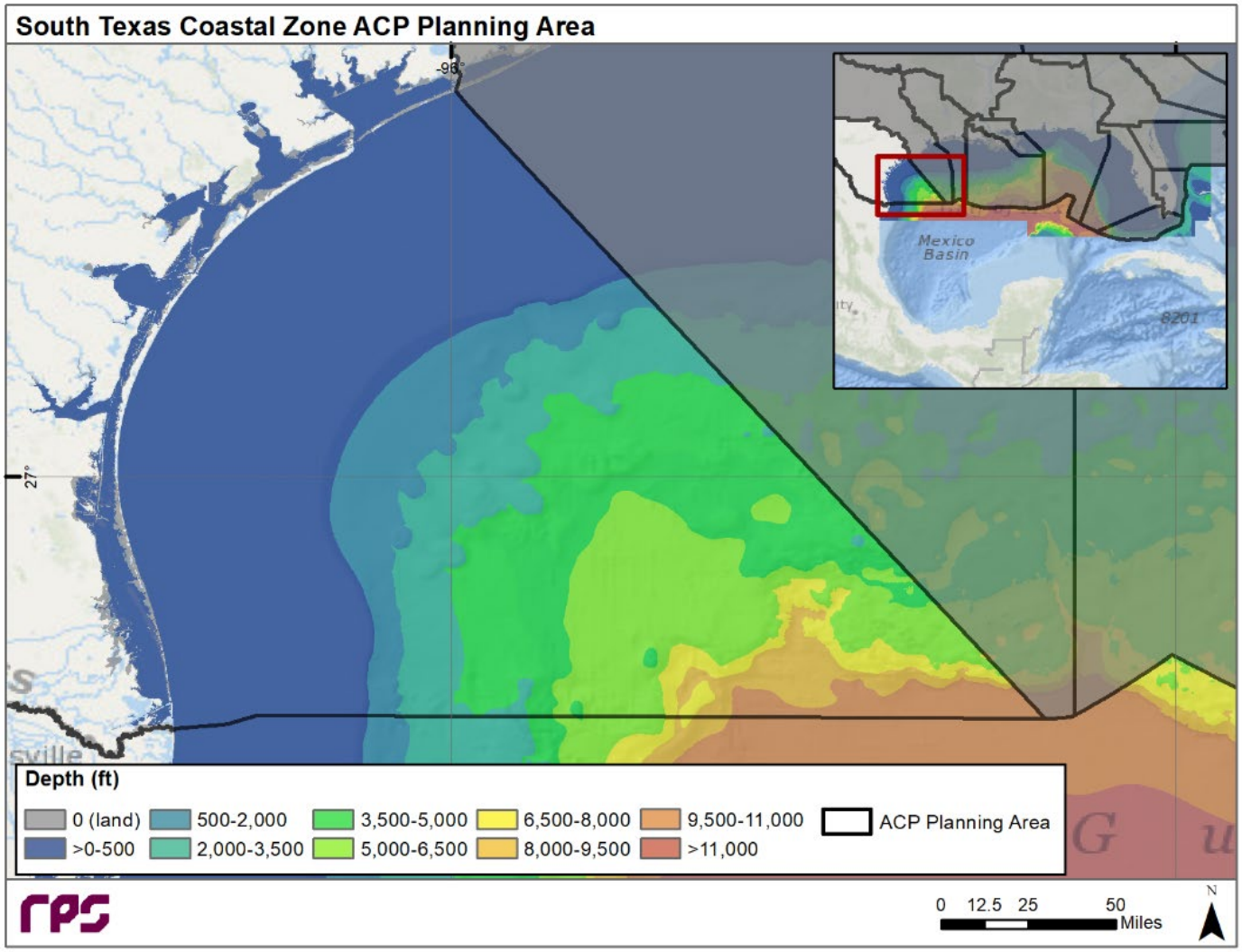

Figure 14. Bathymetry of South Texas Coastal Zone ACP Planning Area.

4.3 OCS Wells

The wells by status in the South Texas Coastal Zone ACP Planning Area are summarized in Table 7. A map of the active well locations by production type is shown in Figure 15.

Table 7. Numbers of OCS Wells in South Texas Coastal Zone ACP Planning Area.

Location Depth	Well Status[12]		Total
	Active Wells	Permanently Abandoned	
Shallow	54	1,061	1,115
Deepwater	56	42	98
Total	110	1,103	1,213

Table 8. Age Categories of Shallow Wells in South Texas Coastal Zone by Well Status.

Well Status[13]	Total Wells (by Age)			Total
	< 20 years	20–50 years	> 50 years	
Active Wells	18	36	0	54
Permanently Abandoned	99	959	3	1,061
Total Wells	117	995	3	1,115

Table 9. Age Categories of Deepwater Wells in South Texas Coastal Zone by Well Status.

Well Status[14]	Total Wells (by Age)			Total
	< 20 years	20–50 years	> 50 years	
Active Wells	51	5	0	56
Permanently Abandoned	27	15	0	42
Total Wells	78	20	0	98

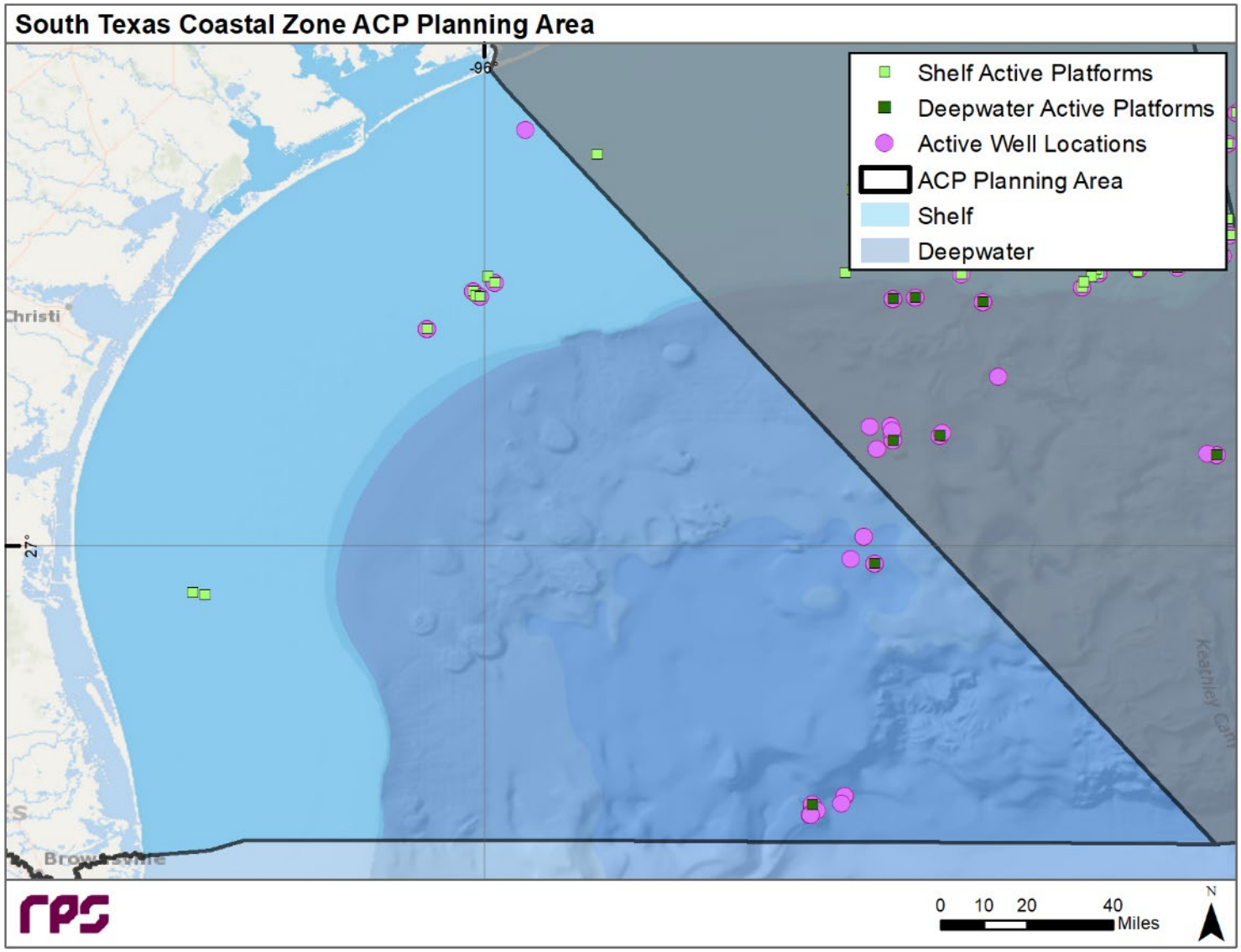

Figure 15. OCS Platforms and Wells in South Texas Coastal Zone ACP Planning Area.

4.4 ROW Pipelines

The locations of ROW pipelines that cross through the South Texas Coastal Zone ACP Planning Area are shown in Figure 16. To avoid cluttering the figure, lease term pipelines, which are pipelines contained within a single lease or a group of leases, are not shown. Examples of lease term pipelines are lines that connect between platforms or tie platforms into ROW pipelines

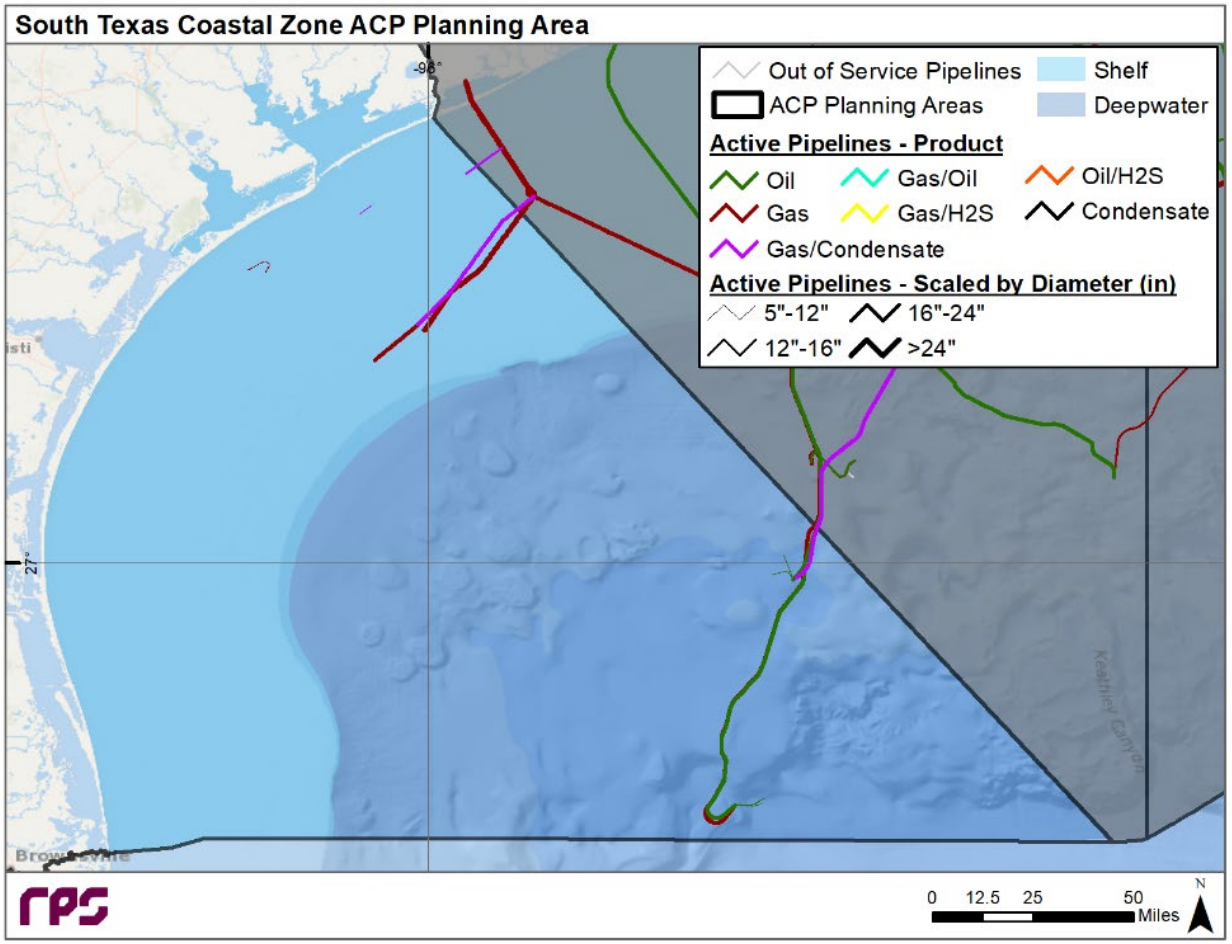

Figure 16. ROW Pipelines in South Texas Coastal Zone ACP Planning Area.

4.5 Offshore Production

Offshore oil and gas production in the South Texas Coastal Zone ACP Planning Area is summarized in Table 10. Each year, over 21 million bbl of oil and over 33 million mcf of gas are produced. Most of the oil (nearly 100%) is produced in the deepwater areas. Most of the gas (nearly 87%) is also produced in the deepwater areas.

Table 10. Offshore Oil and Gas Production in South Texas Coastal Zone ACP Planning Area.

Location Type	Annual Oil Production (bbl)	Annual Gas Production (mcf)
Shallow	7,417	4,365,546
Deepwater	21,578,608	29,219,478
Total	**21,586,025**	**33,585,024**

4.5.1 Highest-Producing Leases

The highest-producing oil and gas leases in the South Texas Coastal Zone ACP Planning Area are shown in Table 11 and Table 12, respectively. The highest-producing lease locations are shown in the map in Figure 17.

Table 11. Highest-Producing Oil Leases in South Texas Coastal Zone.[6]

Lease Number	Area-Block	Depth Category	Annual Production	
			Oil + Condensate (bbl)	Gas in Same Lease (mcf)
G17565	AC857	Deepwater	12,516,914	16,711,567
G19409	AC815	Deepwater	2,465,985	1,368,932
G17561	AC813	Deepwater	2,174,509	5,010,336
G20870	AC856	Deepwater	1,487,361	2,116,675
G10380	AC25	Deepwater	852,137	968,768

Table 12. Highest-Producing Gas Leases in South Texas Coastal Zone.

Lease Number	Area-Block	Depth Category	Annual Production	
			Gas (mcf)	Oil + Condensate in Same Lease (bbl)
G17565	AC857	Deepwater	16,711,567	12,516,914
G17561	AC813	Deepwater	5,010,336	2,174,509
G20870	AC856	Deepwater	2,116,675	1,487,361
G19409	AC815	Deepwater	1,368,932	2,465,985
G01757	BAA105	Shallow	1,567,598	2,245

[6] Based on BSEE data for 31 October 2019–30 November 2020.

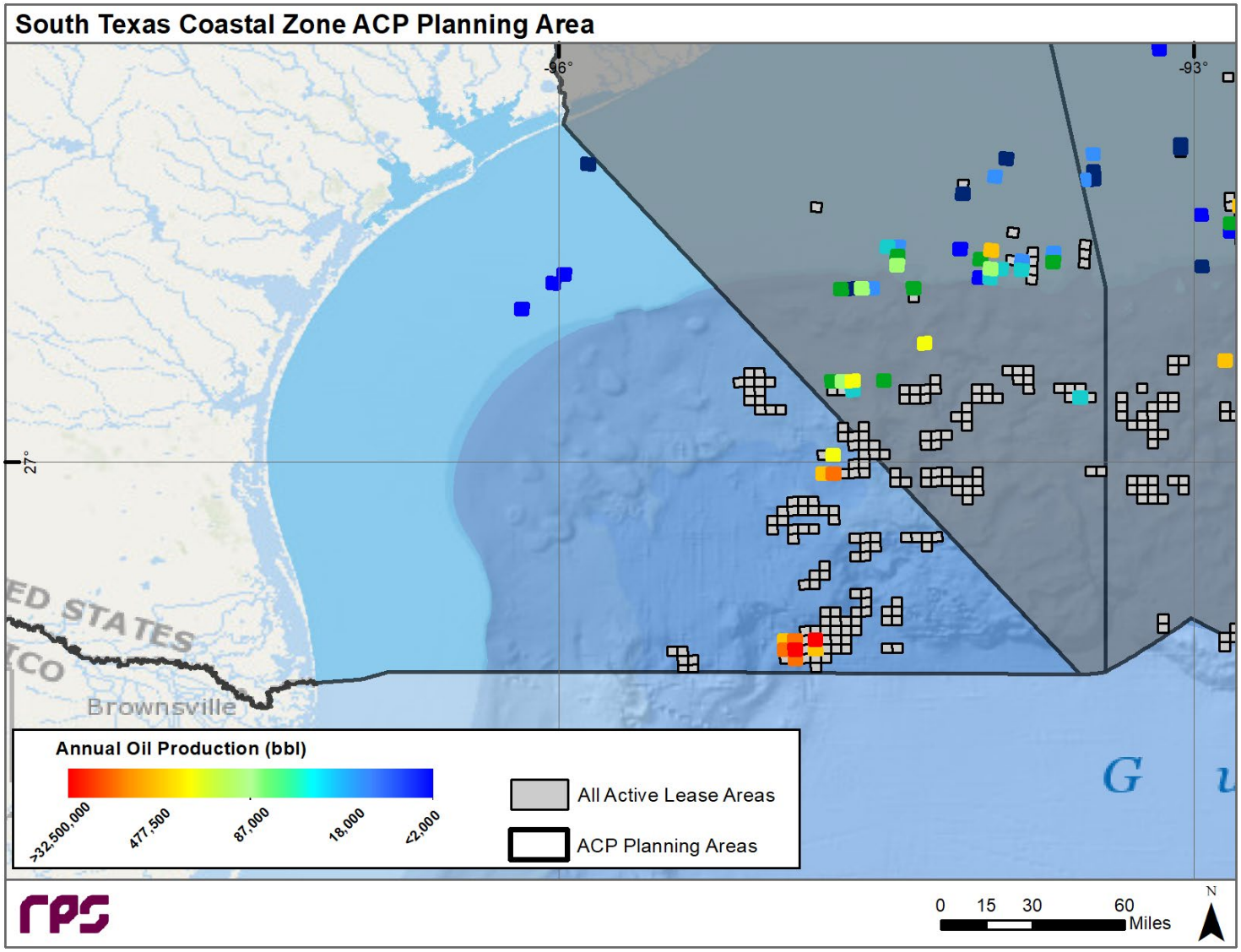

Figure 17. Highest-Producing Leases in South Texas Coastal Zone ACP Planning Area.

5 Central Texas Coastal (Houston-Galveston)

5.1 Oil and Gas Fields

The Central Texas Coastal (Houston-Galveston) ACP Planning Area includes the gas fields in a portion of the Brazos, Galveston, and Garden Banks areas. Overall, the Central Texas Coastal zone is greater than 90% natural gas fields. Some oil fields begin to appear towards the southern extent of High Island and account for approximately half of the fields in East Breaks. A small, western portion of the Keathley Canyon protraction is included, containing a few oil fields. Approximately one-third of the geologic trapping styles for these fields involve faulted anticlines and normal faults, most of which can be found proximal to the shoreline along the northern regions of Brazos, Galveston, and High Island. Another third of the trapping mechanisms is salt-related features, primarily concentrated in the southernmost extent of Galveston and High Island, as well as East Breaks. The final third is distributed evenly among stratigraphic, normal faulting, and rollover features as the geologic trapping style. Hydrocarbon-bearing sands were identified between 1,000 and 31,000 feet subsea.

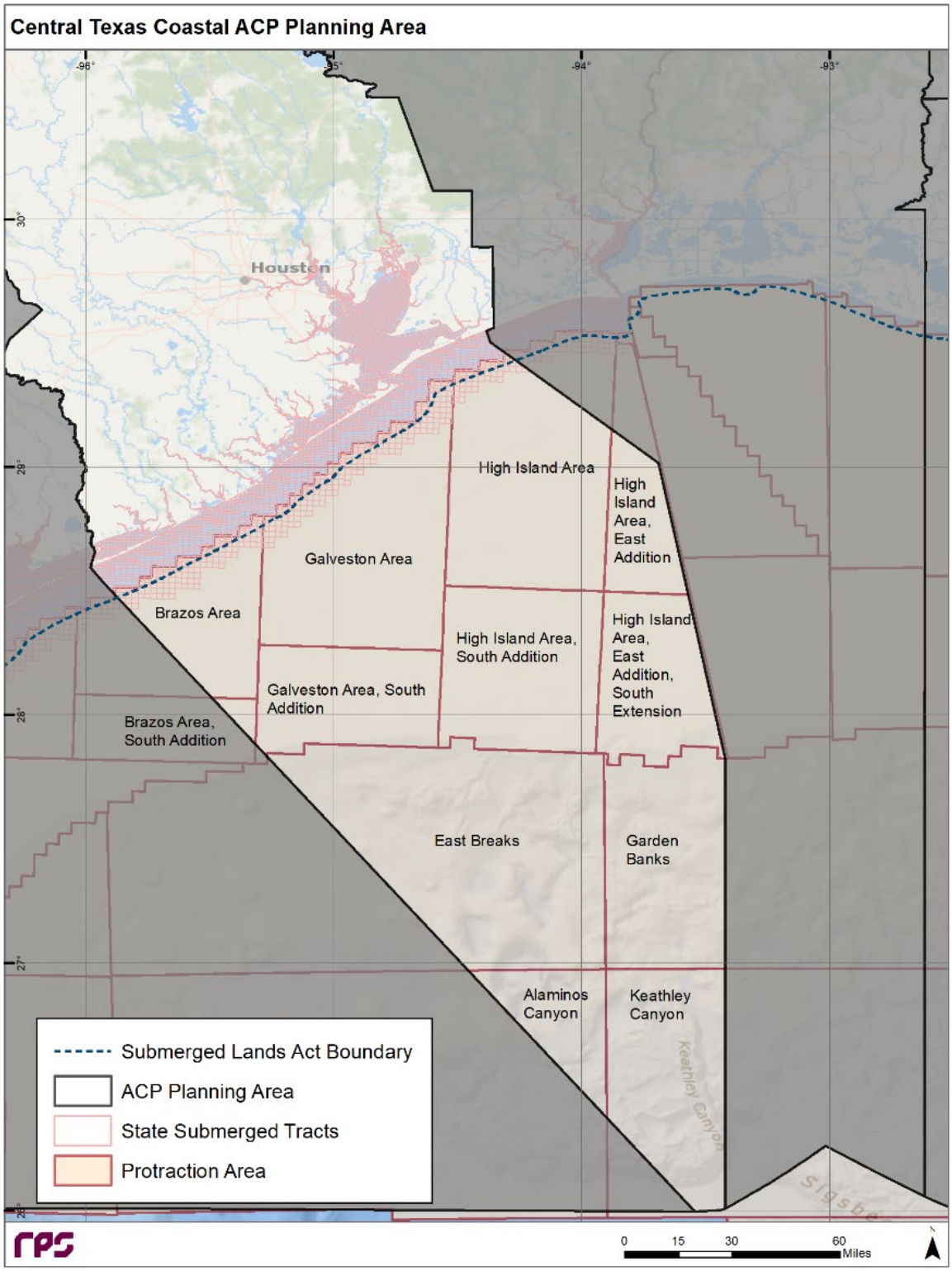

Figure 18. Protraction Areas in the Central Texas Coastal ACP Planning Area.

(Note: Lease blocks in TX waters are referred to as "GOM Tract Number XX" and are sequentially numbered from north to south).

5.2 Bathymetry

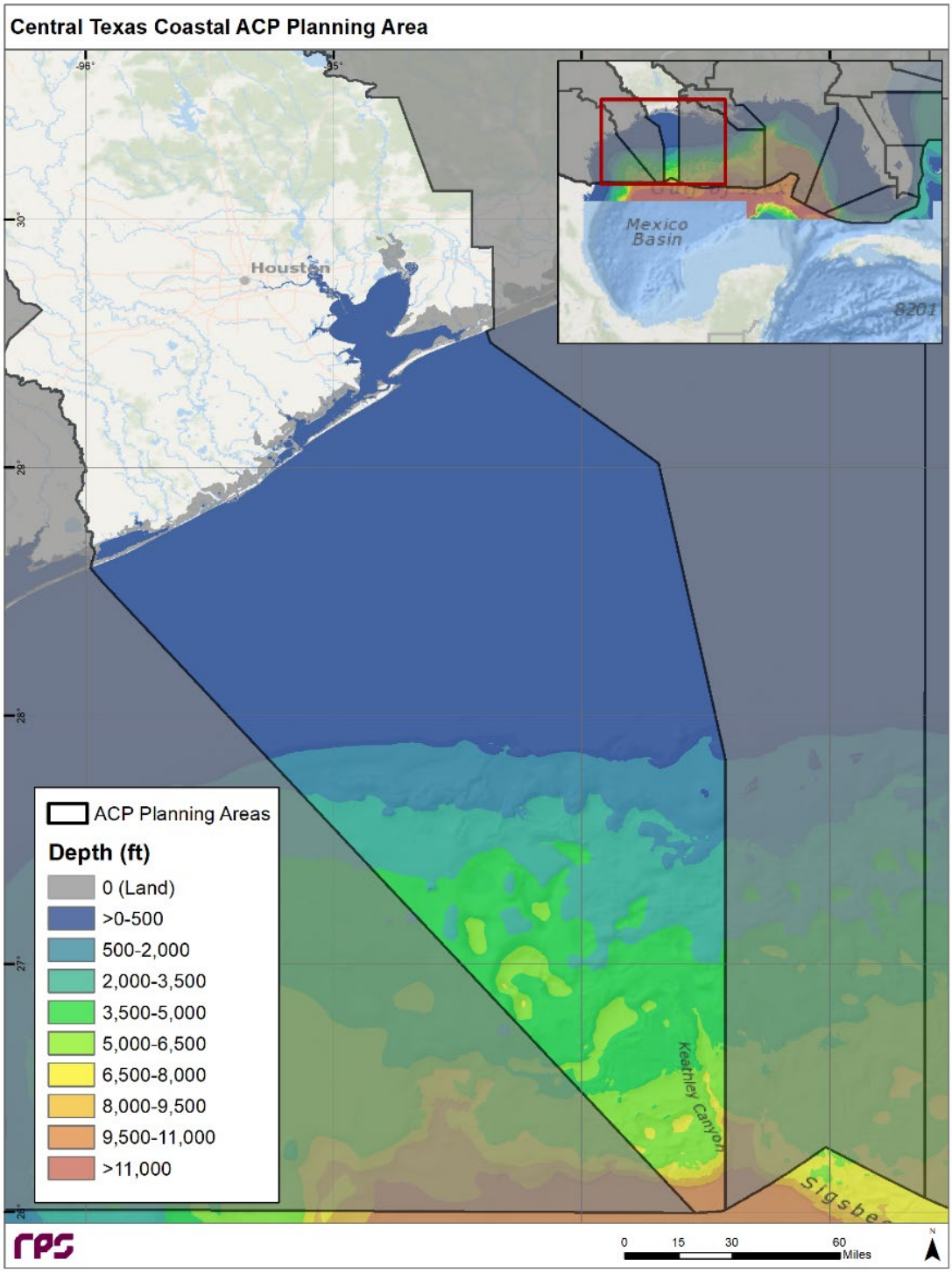

Figure 19. Bathymetry of Central Texas Coastal ACP Planning Area.

5.3 OCS Wells

The wells by status in the Central Texas Coastal ACP Planning Area are summarized in Table 13. A map of the active well locations by production type is shown in Figure 20. Shallow wells are classified by age in Table 14, and deepwater wells are classified by age in Table 15.

Table 13. Numbers of OCS Wells in Central Texas Coastal Planning Area.

Location Depth	Well Status[16]		Total
	Active Wells	Permanently Abandoned	
Shallow	121	1,730	1,851
Deepwater	79	180	259
Total	200	1,910	2,110

Table 14. Age Categories of Shallow Wells in Central Texas Coastal by Well Status.

Well Status[17]	Total Wells (by Age)			Total
	< 20 years	20–50 years	> 50 years	
Active Wells	30	88	3	121
Permanently Abandoned	180	1,194	356	1,730
Total Wells	210	1,282	359	1,851

Table 15. Age Categories of Deepwater Wells in Central Texas Coastal by Well Status.

Well Status[18]	Total Wells (by Age)			Total
	< 20 years	20–50 years	> 50 years	
Active Wells	13	66	0	79
Permanently Abandoned	45	135	0	180
Total Wells	58	201	0	259

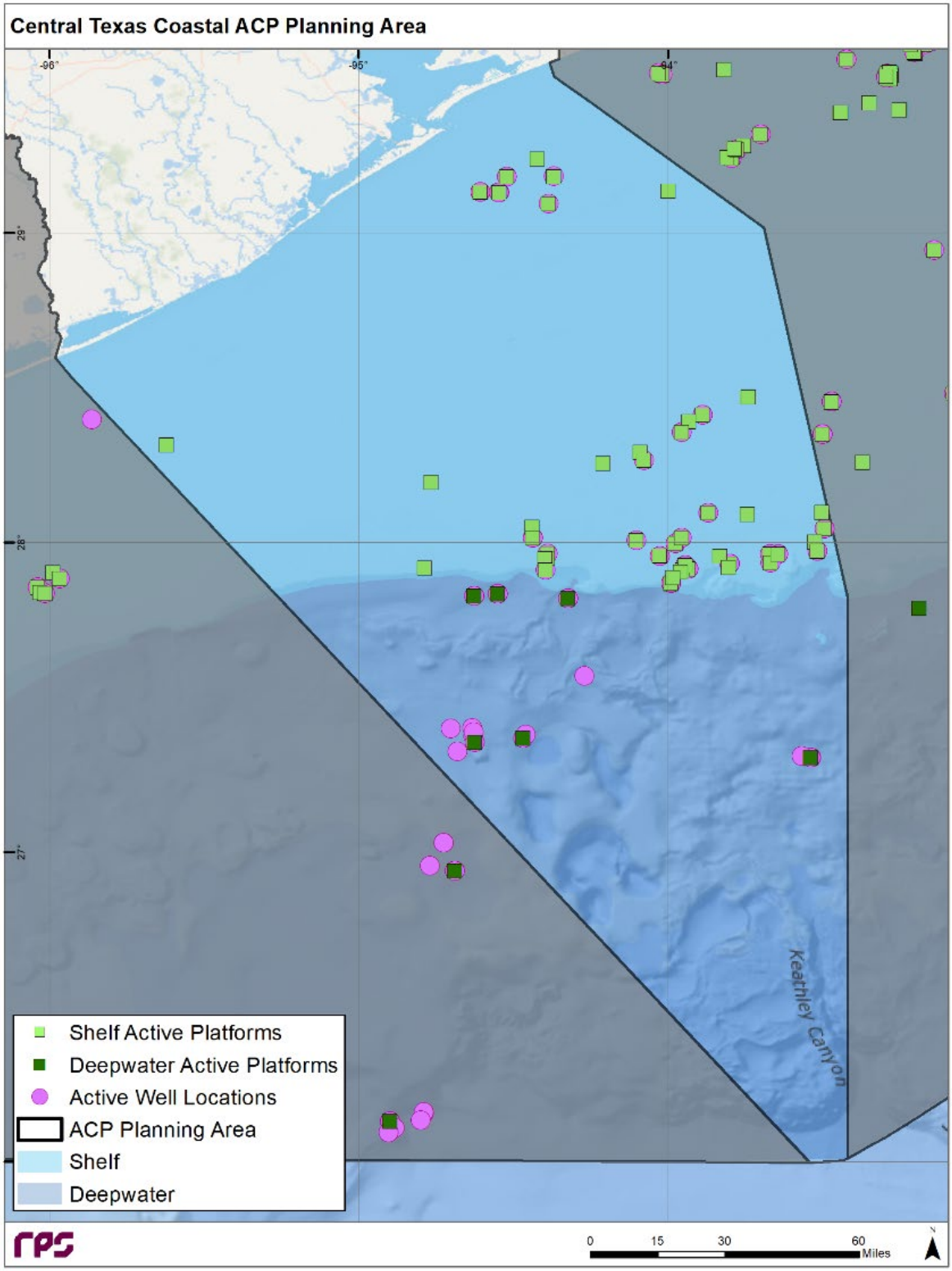

Figure 20. OCS Platforms and Wells in Central Texas Coastal ACP Planning Area.

5.4 ROW Pipelines

The locations of ROW pipelines that cross through the Central Texas Coastal ACP Planning Area are shown in Figure 21. To avoid cluttering the figure, lease term pipelines, which are pipelines contained within a single lease or a group of leases, are not shown. Examples of lease term pipelines are lines that connect between platforms or tie platforms into ROW pipelines.

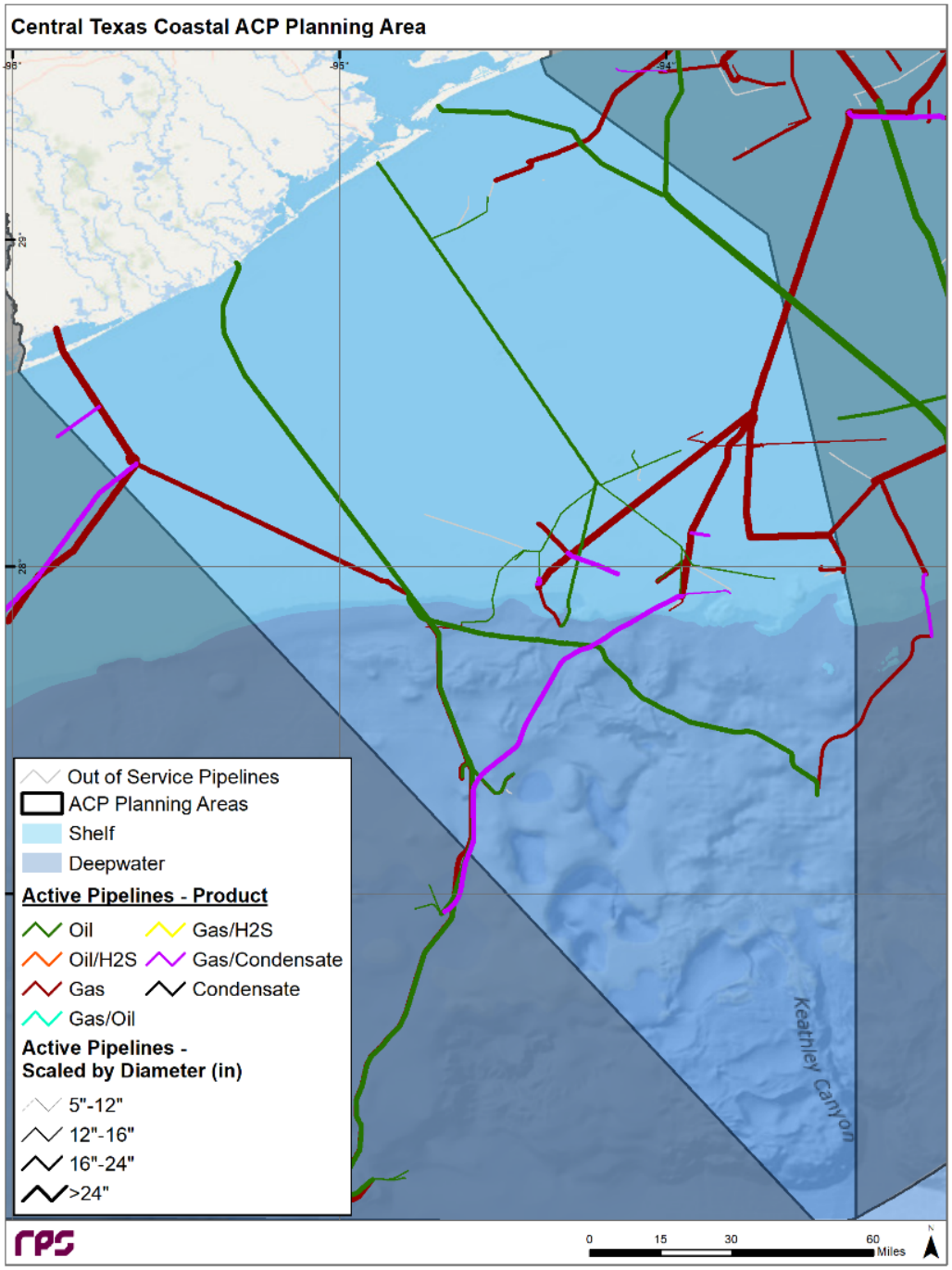

Figure 21. ROW Pipelines in Central Texas Coastal ACP Planning Area.

5.5 Offshore Production

Offshore oil and gas production in the Central Texas Coastal ACP Planning Area rea is summarized in Table 16. Each year, over 2 million bbl of oil and over 25 million mcf of gas are produced. Most of the oil (nearly 58%) is produced in the shallow areas. Most of the gas (nearly 76%) is also produced in the shallow areas.

Table 16. Offshore Oil and Gas Production in Central Texas Coastal ACP Planning Area.

Location Type	Annual Oil Production (bbl)	Annual Gas Production (mcf)
Shallow	1,153,215	11,414,185
Deepwater	847,779	3,620,748
Total	**2,000,994**	**15,034,933**

5.5.1 Highest-Producing Leases

The highest-producing oil and gas leases in the Central Texas Coastal ACP Planning Area are shown in Table 17 and Table 18, respectively. The locations of the highest-producing leases are shown in the map in Figure 22.

Table 17. Highest-Producing Oil Leases in Central Texas Coastal.[7]

Lease Number	Area-Block	Depth Category	Annual Production	
			Oil + Condensate (bbl)	Gas in Same Lease (mcf)
G02705	HIA 547	Shallow	263,690	5,398,733
G06093	GA209	Shallow	231,135	220,128
G19028	EB599	Deepwater	189,889	205,327
G19001	EB430	Deepwater	186,532	191,809
G02719	HIA 582	Shallow	119,202	1,055,521

Table 18. Highest-Producing Gas Leases in Central Texas Coastal.

Lease Number	Area-Block	Depth Category	Annual Production	
			Gas (mcf)	Oil + Condensate in Same Lease (bbl)
G02705	HIA 547	Shallow	5,398,733	263,690
G02647	EB160	Deepwater	1,516,462	78,165
G27509	HI176	Shallow	1,391,965	18,638
G02391	HIA 571	Shallow	1,079,201	76,846
G02719	HIA 582	Shallow	1,055,521	119,202

[7] Based on BSEE data for 31 October 2019–30 November 2020.

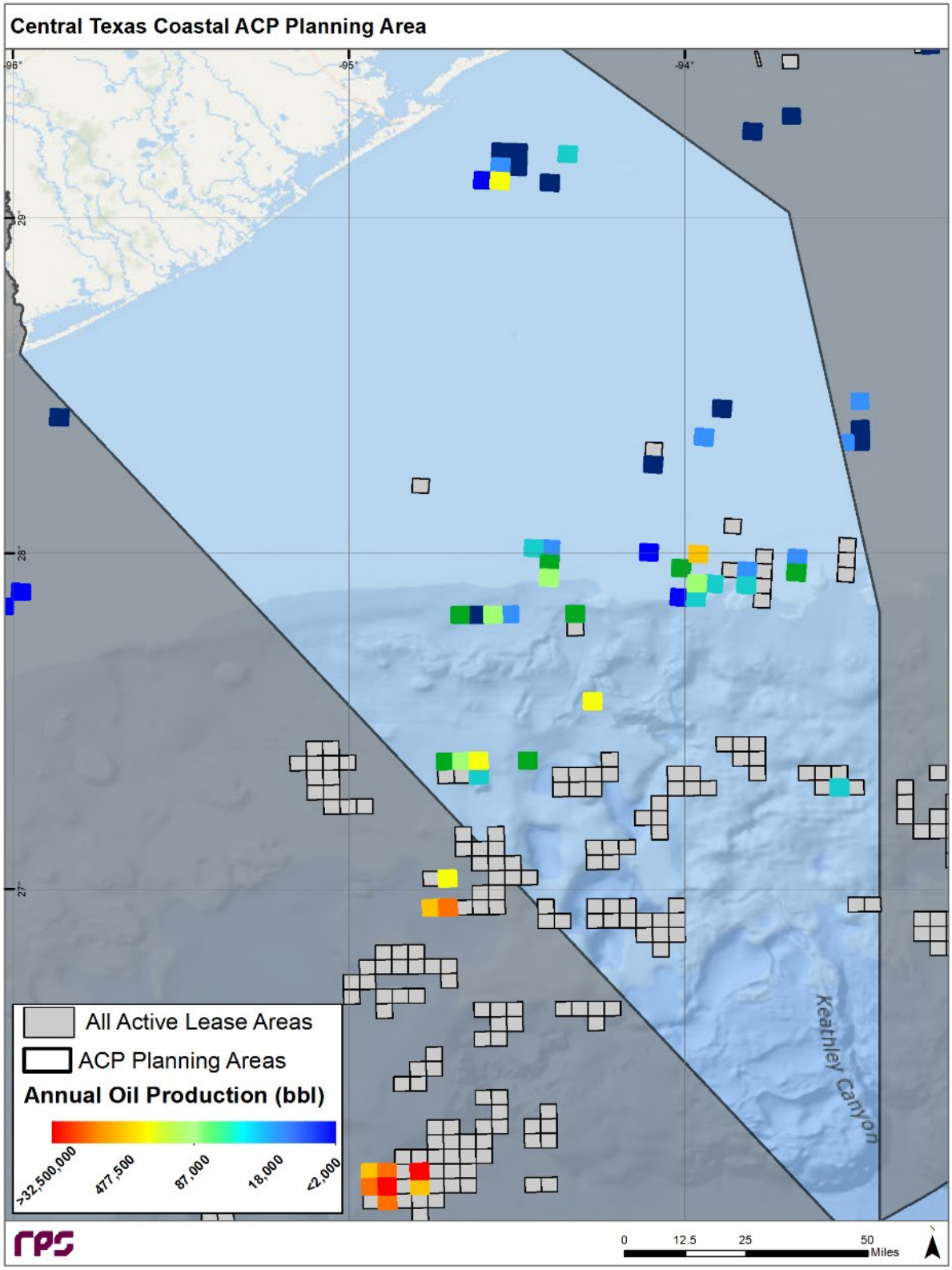

Figure 22. Highest-Producing Leases in Central Texas Coastal ACP Planning Area.

6 Southeast Texas and Southwest Louisiana (Port Arthur)

6.1 Oil and Gas Fields

Predominantly comprised of gas fields, the Southeast Texas and Southwest Louisiana (Port Arthur) ACP Planning Area extends from West Cameron in the north, down to Keathley Canyon at its southernmost protraction. Of the nearly two-hundred forty fields, just 5% are oil fields, with only the Keathley Canyon area consisting of exclusively oil fields. Fault traps make up approximately a third of the reservoir trapping mechanisms in the Port Arthur ACP Planning Area, while those associated with salt features comprise just under another third. The remaining trap styles are mostly structural traps associated with faulted anticlinal features, with some rollover into growth faults. Hydrocarbon-bearing sands were identified between 800 and 35,000 feet subsea).

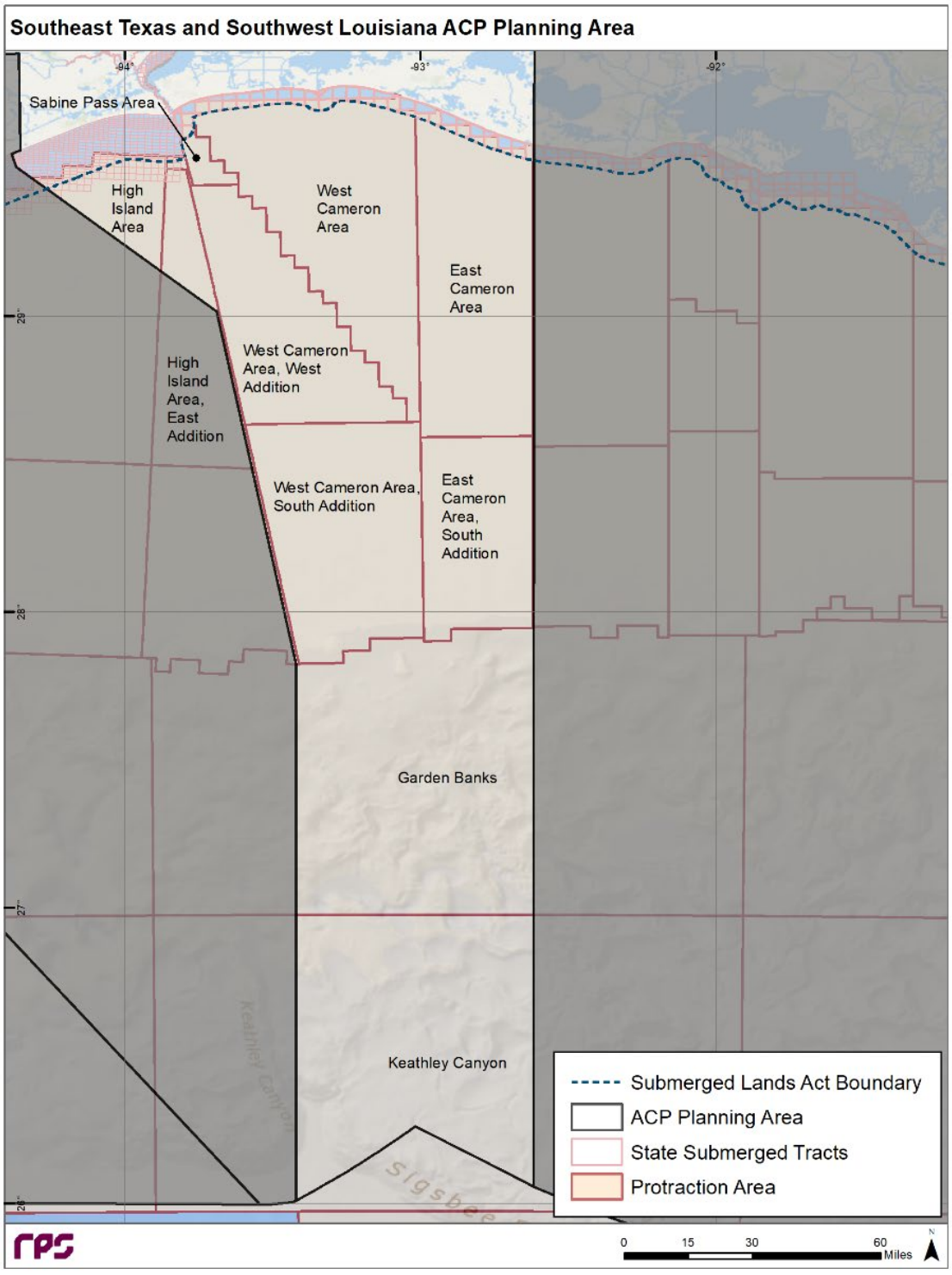

Figure 23. Protraction Areas in the Southeast Texas & Southwest Louisiana ACP Planning Area.

(Note: Lease blocks in TX waters are referred to as "GOM Tract Number XX" and are sequentially numbered from north to south. Lease blocks in LA waters align with OCS protraction names and numbers.)

6.2 Bathymetry

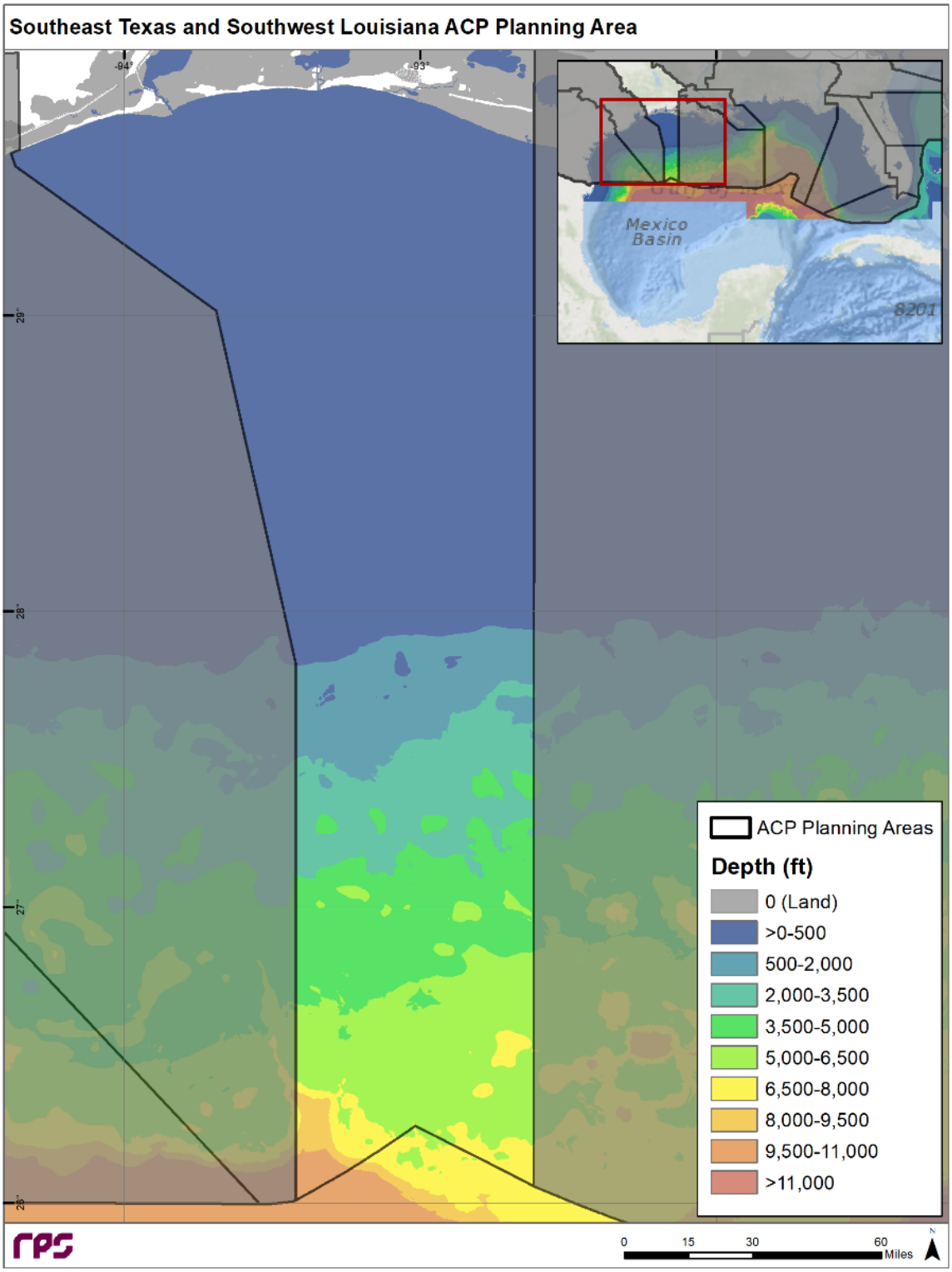

Figure 24. Bathymetry of Southeast Texas and Southwest Louisiana ACP Planning Area.

6.3 OCS Wells

The wells by status in the Southeast Texas and Southwest Louisiana ACP Planning Area are summarized in Table 19. A map of the active well locations by production type is shown in Figure 25. Shallow wells are classified by age in Table 20, and deepwater wells are classified by age in Table 21.

Table 19. Numbers of OCS Wells in Southeast Texas and Southwest Louisiana ACP Planning Area.

Location Depth	Well Status[20]		Total
	Active Wells	Permanently Abandoned	
Shallow	605	4,835	5,440
Deepwater	0	5	5
Total	605	4,840	5,445

Table 20. Age Categories of Shallow Wells in Southeast Texas and Southwest Louisiana by Well Status.

Well Status[21]	Total Wells (by Age)			Total
	< 20 years	20–50 years	> 50 years	
Active Wells	114	469	22	605
Permanently Abandoned	421	3,930	484	4,835
Total Wells	535	4,399	506	5,440

Table 21. Age Categories of Deepwater Wells in Southeast Texas and Southwest Louisiana by Well Status.

Well Status[22]	Total Wells (by Age)			Total
	< 20 years	20–50 years	> 50 years	
Active Wells	0	0	0	0
Permanently Abandoned	0	5	0	5
Total Wells	0	5	0	5

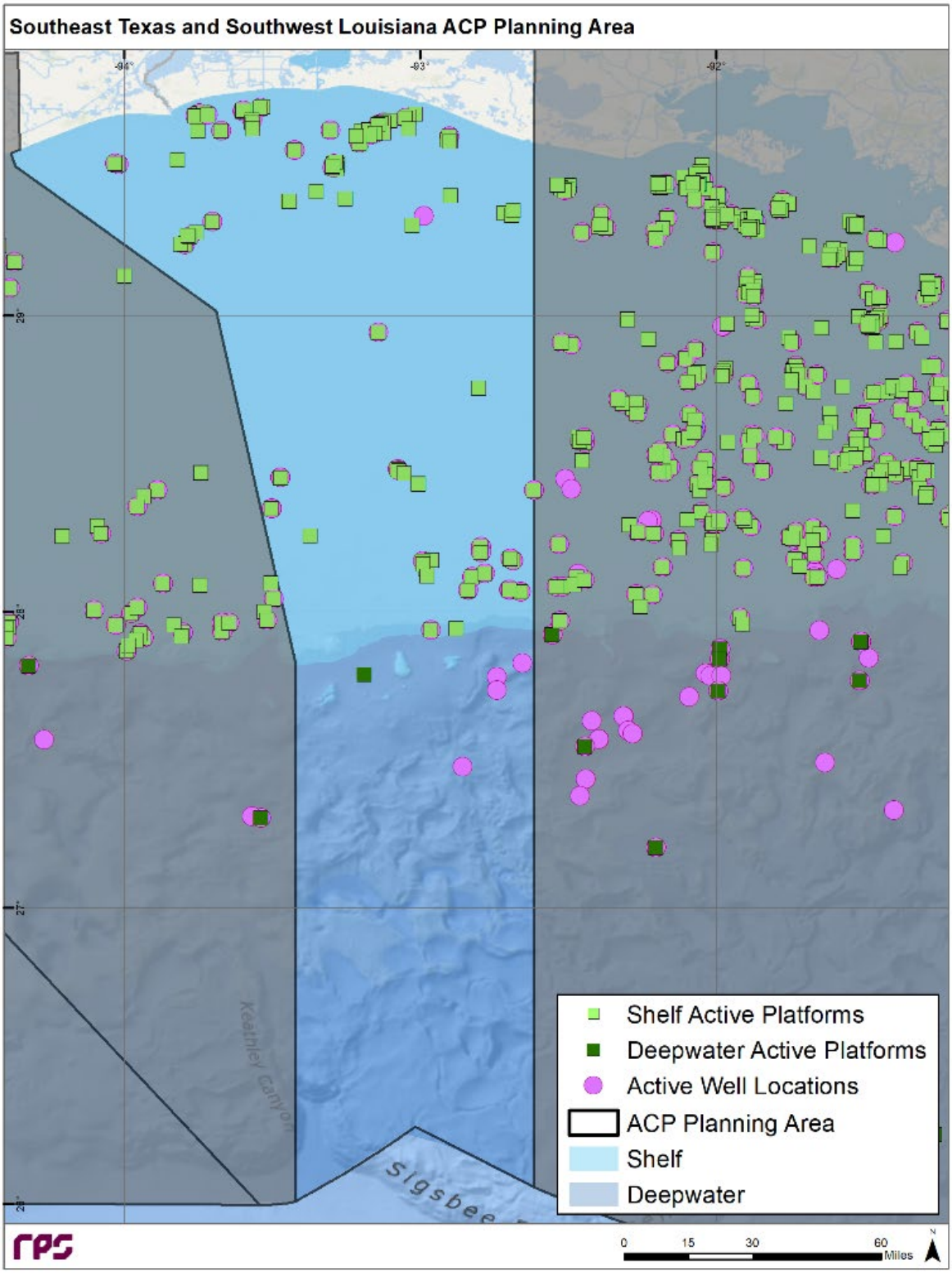

Figure 25. Active OCS Platforms and Wells in Southeast Texas-Southwest Louisiana ACP Planning Area.

6.4 ROW Pipelines

The locations of ROW pipelines that cross through the Southeast Texas and Southwest Louisiana ACP Planning Area are shown in Figure 26. To avoid cluttering the figure, lease term pipelines, which are pipelines contained within a single lease or a group of leases, are not shown. Examples of lease term pipelines are lines that connect between platforms or tie platforms into ROW pipelines.

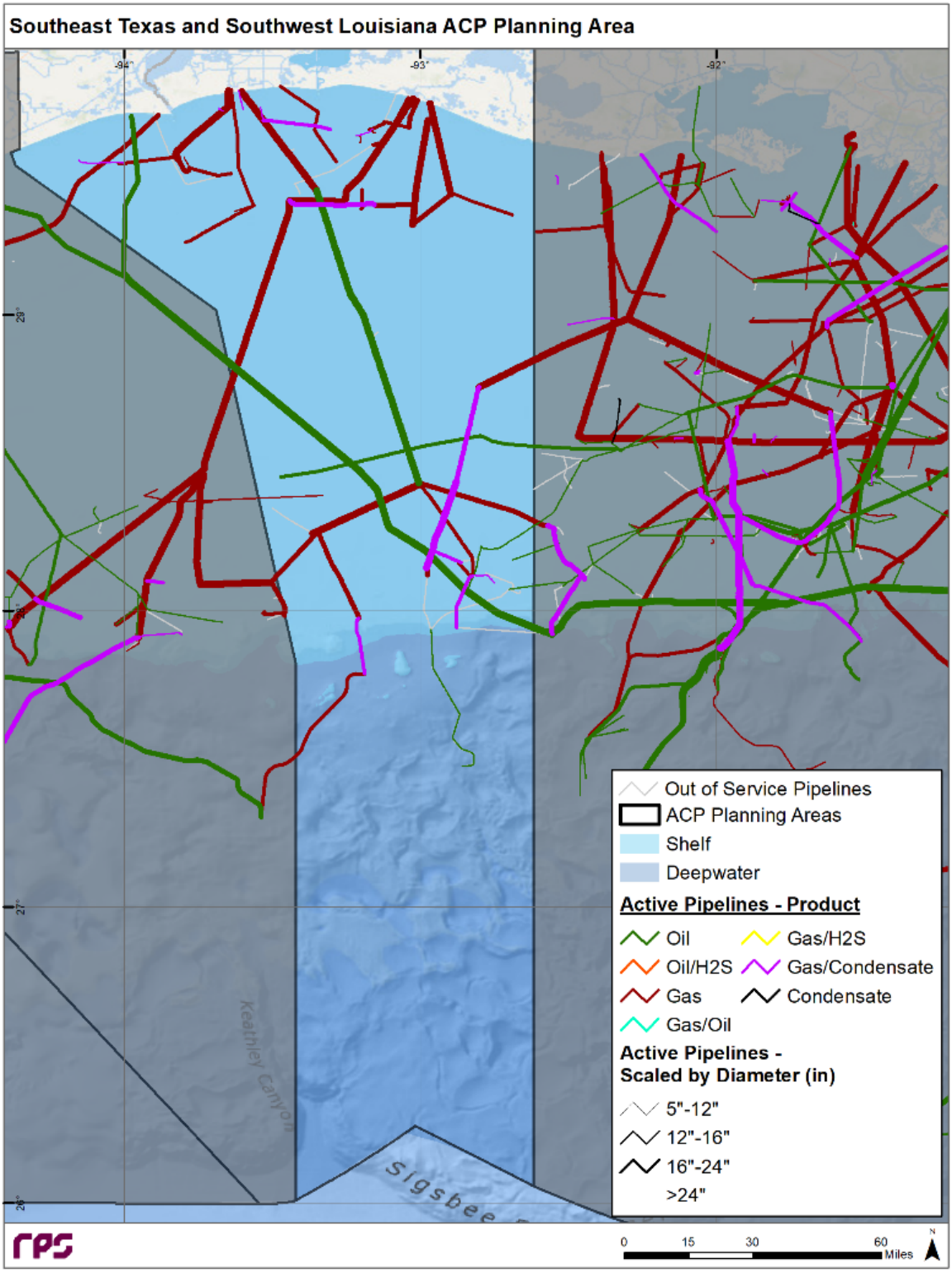

Figure 26. ROW Pipelines in Southeast Texas and Southwest Louisiana ACP Planning Area.

6.5 Offshore Production

Offshore oil and gas production in the Southeast Texas and Southwest Louisiana ACP Planning Area is summarized in Table 22. Each year, about 1.4 million bbl of oil and nearly 14 million mcf of gas are produced. Most of the oil (over 73%) is produced in the shallow areas. Most of the gas (over 91%) is also produced in the shallow areas.

Table 22. Offshore Oil and Gas Production in Southeast Texas + Southwest Louisiana ACP Planning Area.

Location Type	Annual Oil Production (bbl)	Annual Gas Production (mcf)
Shallow	1,020,773	12,581,074
Deepwater	368,378	1,176,988
Total	**1,389,151**	**13,758,062**

6.5.1 Highest-Producing Leases

The highest-producing oil and gas leases in the Southeast Texas and Southwest Louisiana ACP Planning Area are shown in Table 23 and Table 24, respectively. The locations of the highest-producing leases are shown in the map in Figure 27.

Table 23. Highest-Producing Oil Leases in Southeast Texas and Southwest Louisiana.[8]

Lease Number	Area-Block	Depth Category	Annual Production	
			Oil + Condensate (bbl)	Gas in Same Lease (mcf)
G02061	EC321	Shallow	363,546	633,588
G26664	GB506	Deepwater	317,373	1,002,867
G10638	EC328	Shallow	166,086	32,948
G06655	EC346	Shallow	105,893	235,271
G02047	EC272	Shallow	103,469	0

Table 24. Highest-Producing Gas Leases in Southeast Texas and Southwest Louisiana.

Lease Number	Area-Block	Depth Category	Annual Production	
			Gas (mcf)	Oil + Condensate in Same Lease (bbl)
G23736	WC73	Shallow	2,083,201	40,236
G22501	WC54	Shallow	1,740,217	14,922
G01351	Multiple[24]	Shallow	1,168,568	3,002
G26664	GB506	Deepwater	1,002,867	317,373
G09387	WC77	Shallow	981,280	1,897

[8] Based on BSEE data for 31 October 2019–30 November 2020.

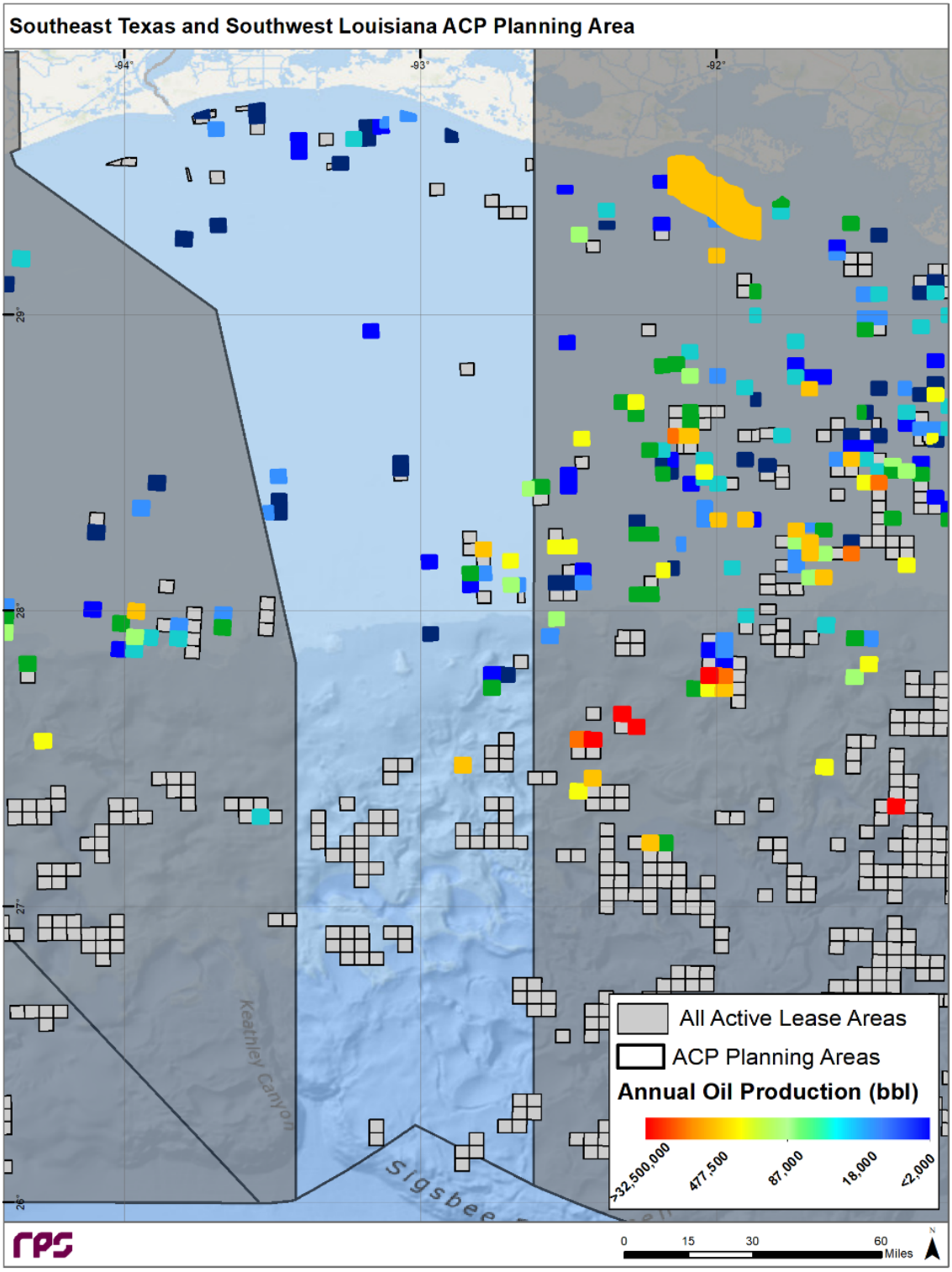

Figure 27. Highest-Producing Leases in Southeast Texas-Southwest Louisiana ACP Planning Area.

7 South-central Louisiana (Houma)

7.1 Oil and Gas Fields

The South-central Louisiana (Houma) ACP Planning Area, covering a large portion of the Central GOM, is comprised of both oil and gas fields. Along the western shelf of this zone (Vermillion to Grand Isle), more than two-thirds of all fields are gas. Moving eastward, West Delta and South Pass are a combination of both oil and gas, while in Ewing Bank, most are oil fields. Progressing into deepwater, the number of oil and gas fields become more evenly distributed in Garden Banks and Atwater Valley, while oil fields comprise at least two-thirds of all fields in the remaining protraction areas. Of the nearly 650 fields in this area, just less than one-third are structural traps associated with faulted anticlinal features, while another third is associated with salt features, most commonly flank traps. Hydrocarbon-bearing sands were identified between 1,000 to 25,000 feet subsea.

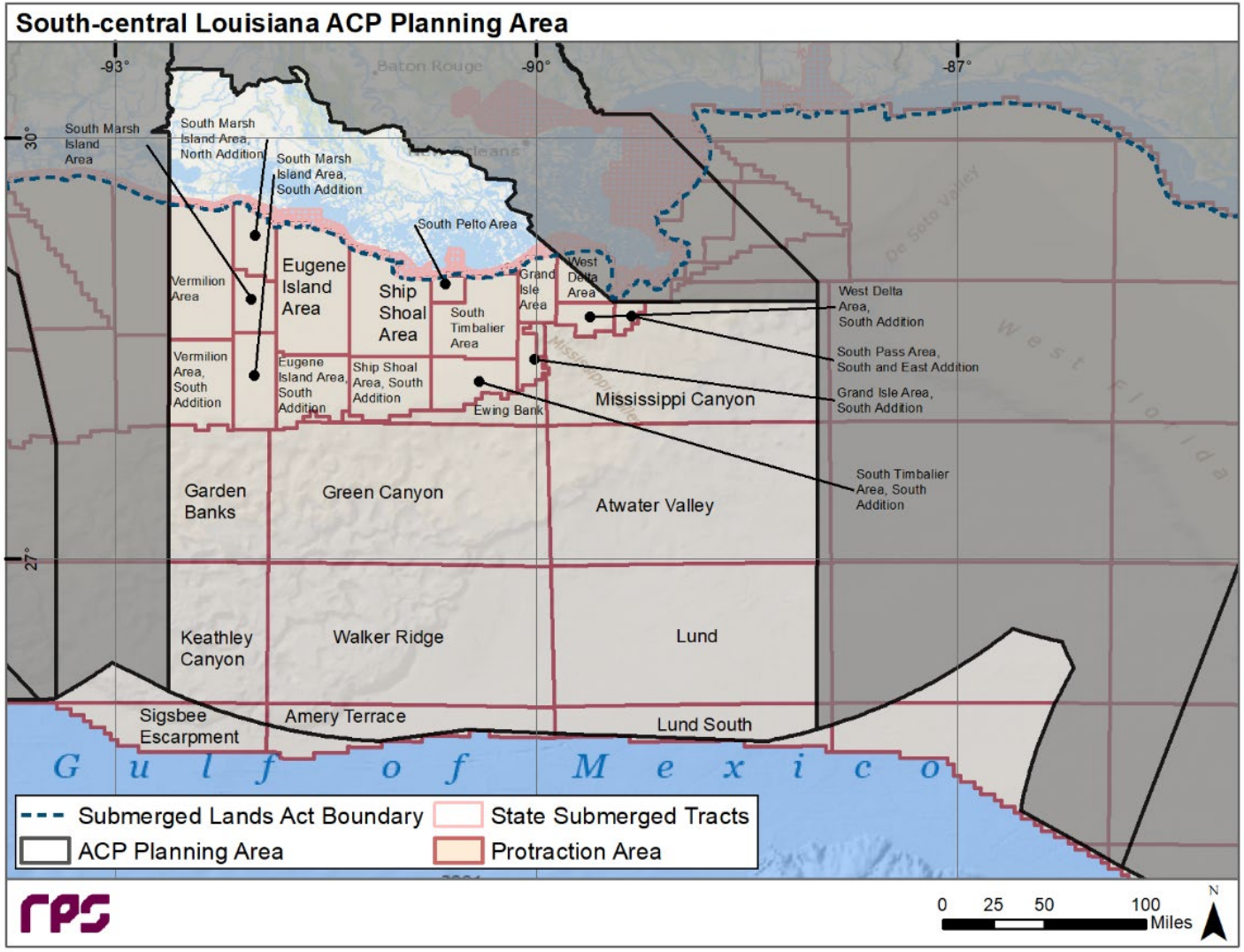

Figure 28. Protraction Areas in the South-central Louisiana ACP Planning Area.

(Note: Lease blocks in LA waters align with OCS protraction names and numbers.)

7.2 Bathymetry

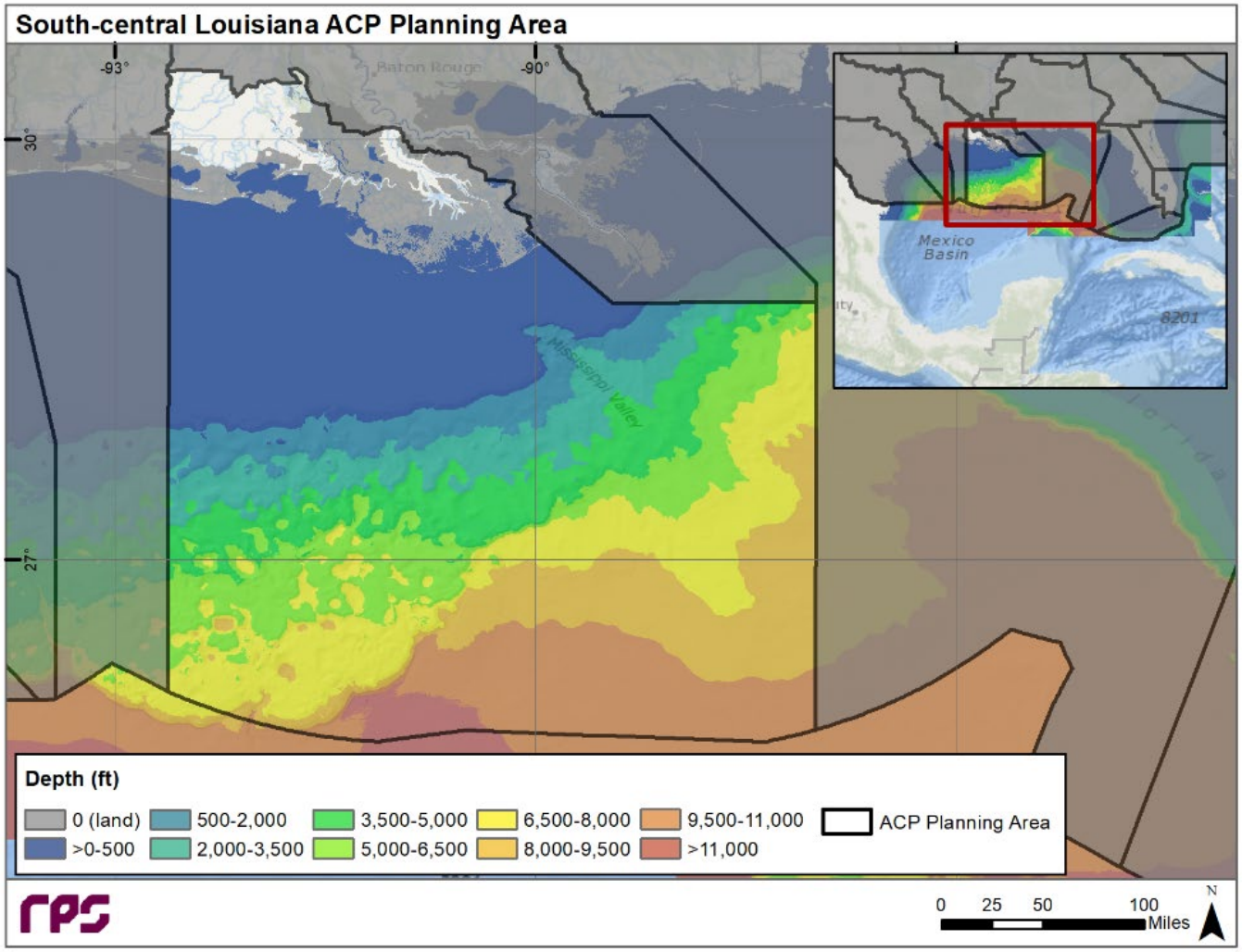

Figure 29. Bathymetry of South-central Louisiana ACP Planning Area.

7.3 OCS Wells

The wells by status in the South-central Louisiana ACP Planning Area are summarized in Table 25. A map of the active well locations by production type is shown in Figure 30. Shallow wells are classified by age in Table 26, and deepwater wells are classified by age in Table 27.

Table 25. Numbers of OCS Wells in South-central Louisiana ACP Planning Area.

Location Depth	Well Status[25]		Total
	Active Wells	Permanently Abandoned	
Shallow	5,547	16,821	22,368
Deepwater	1,214	1,603	2,817
Total	6,761	18,424	25,185

Table 26. Age Categories of Shallow Wells in South-central Louisiana by Well Status.

Well Status[26]	Total Wells (by Age)			Total
	< 20 years	20–50 years	> 50 years	
Active Wells	1,426	3,387	734	5,547
Permanently Abandoned	1,104	9,239	6,478	16,821
Total Wells	2,530	12,626	7,212	22,368

Table 27. Age Categories of Deepwater Wells in South-central Louisiana by Well Status.

Well Status[27]	Total Wells (by Age)			Total
	< 20 years	20–50 years	> 50 years	
Active Wells	858	356	0	1,214
Permanently Abandoned	573	1,029	1	1,603
Total Wells	1,431	1,385	1	2,817

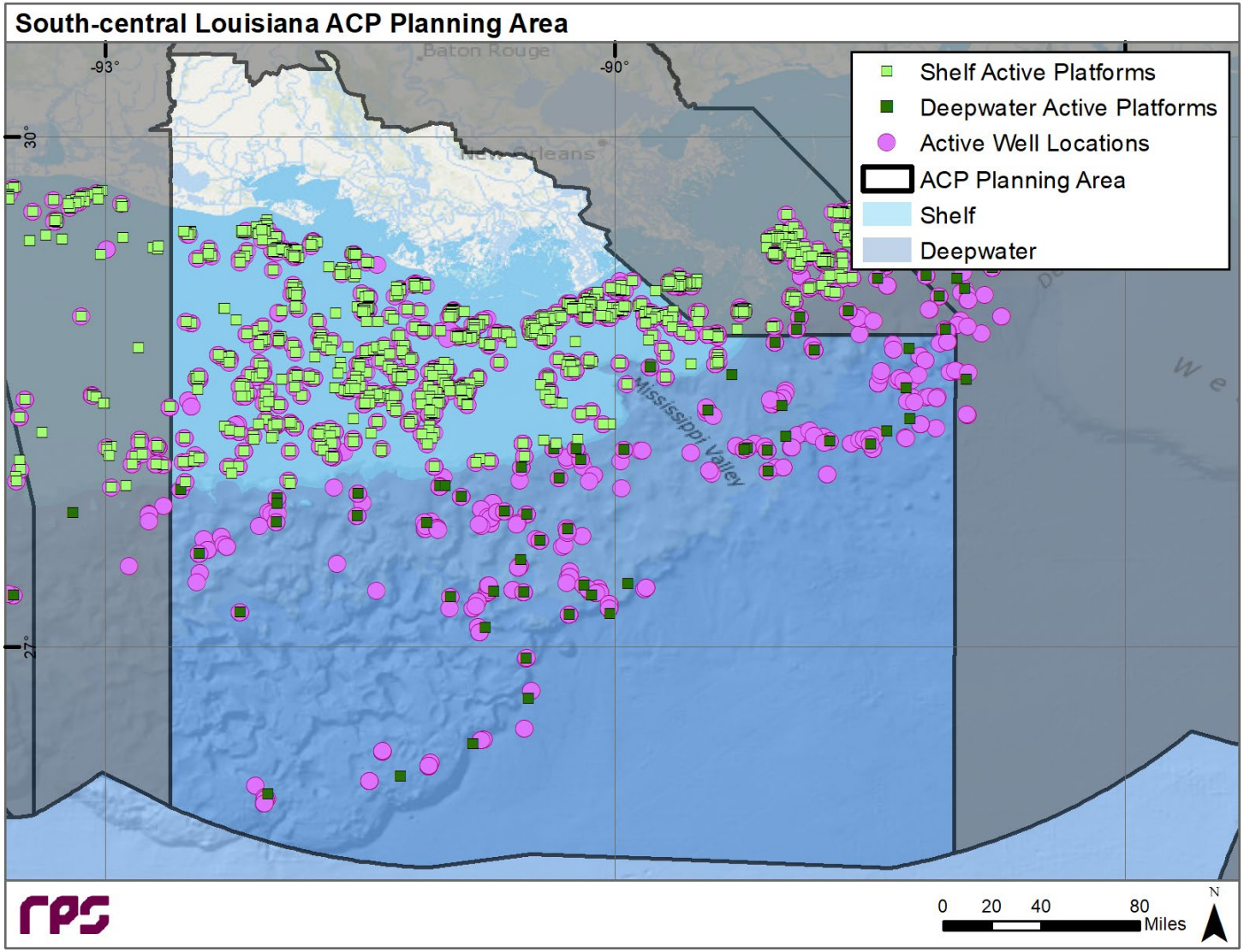

Figure 30. Active OCS Platforms and Wells in South-central Louisiana ACP Planning Area.

7.4 ROW Pipelines

The ROW locations of pipelines that cross through the South-central Louisiana ACP Planning Area are shown in Figure 31. To avoid cluttering the figure, lease term pipelines, which are pipelines contained within a single lease or a group of leases, are not shown. Examples of lease term pipelines are lines that connect between platforms or tie platforms into ROW pipelines.

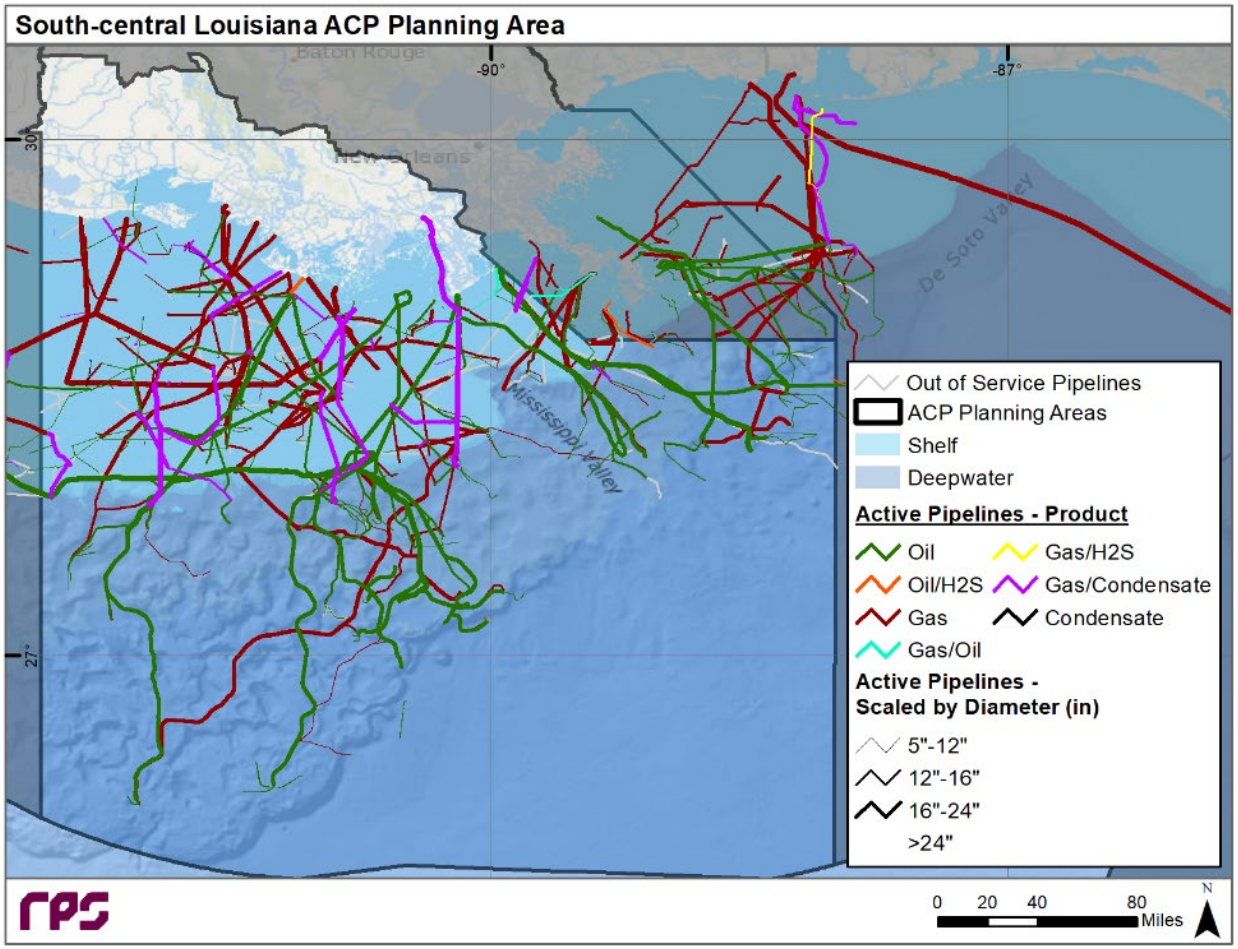

Figure 31. ROW Pipelines in South-central Louisiana ACP Planning Area.

7.5 Offshore Oil and Gas Production

Offshore oil and gas production in the South-central Louisiana ACP Planning Area is summarized in Table 28. Each year, nearly 538 million bbl of oil and over 833 million mcf of gas are produced. Most of the oil (over 91%) is produced in the deepwater areas. Most of the gas (nearly 62%) is also produced in the deepwater areas.

Table 28. Oil and Gas Production in South-central Louisiana

Location Type	Annual Oil Production (bbl)	Annual Gas Production (mcf)
Shallow	47,281,814	318,661,687
Deepwater	490,679,799	514,687,064
Total	537,961,613	833,348,751

7.5.1 Highest-Producing Leases

The highest-producing oil and gas leases in the South-central Louisiana ACP Planning Area are shown in Table 29 and Table 30, respectively. The locations of the highest-producing leases are shown in the map in Figure 32.

Table 29. Highest-Producing Oil Leases in South-central Louisiana.[9]

Lease Number	Area-Block	Depth Category	Annual Production	
			Oil + Condensate (bbl)	Gas in Same Lease (mcf)
G14658	MC822	Deepwater	29,536,775	20,867,776
G20082	GC640	Deepwater	27,212,580	15,416,310
G15607	GC743	Deepwater	24,737,579	17,653,095
G21245	WR678	Deepwater	21,721,320	5,304,966
G07962	MC806	Deepwater	20,563,001	26,665,061

Table 30. Highest-Producing Gas Leases in South-central Louisiana.

Lease Number	Area-Block	Depth Category	Annual Production	
			Gas (mcf)	Oil + Condensate in Same Lease (bbl)
00310	Multiple[29]	Shallow	180,112,428	18,643,428
G07962	MC806	Deepwater	26,665,061	20,563,001
G09216	GB215	Deepwater	23,640,064	6,729,113
G10350	GB386	Deepwater	22,007,531	3,005,866
G14658	MC822	Deepwater	20,867,776	29,536,775

[9] Based on BSEE data for 31 October 2019–30 November 2020.

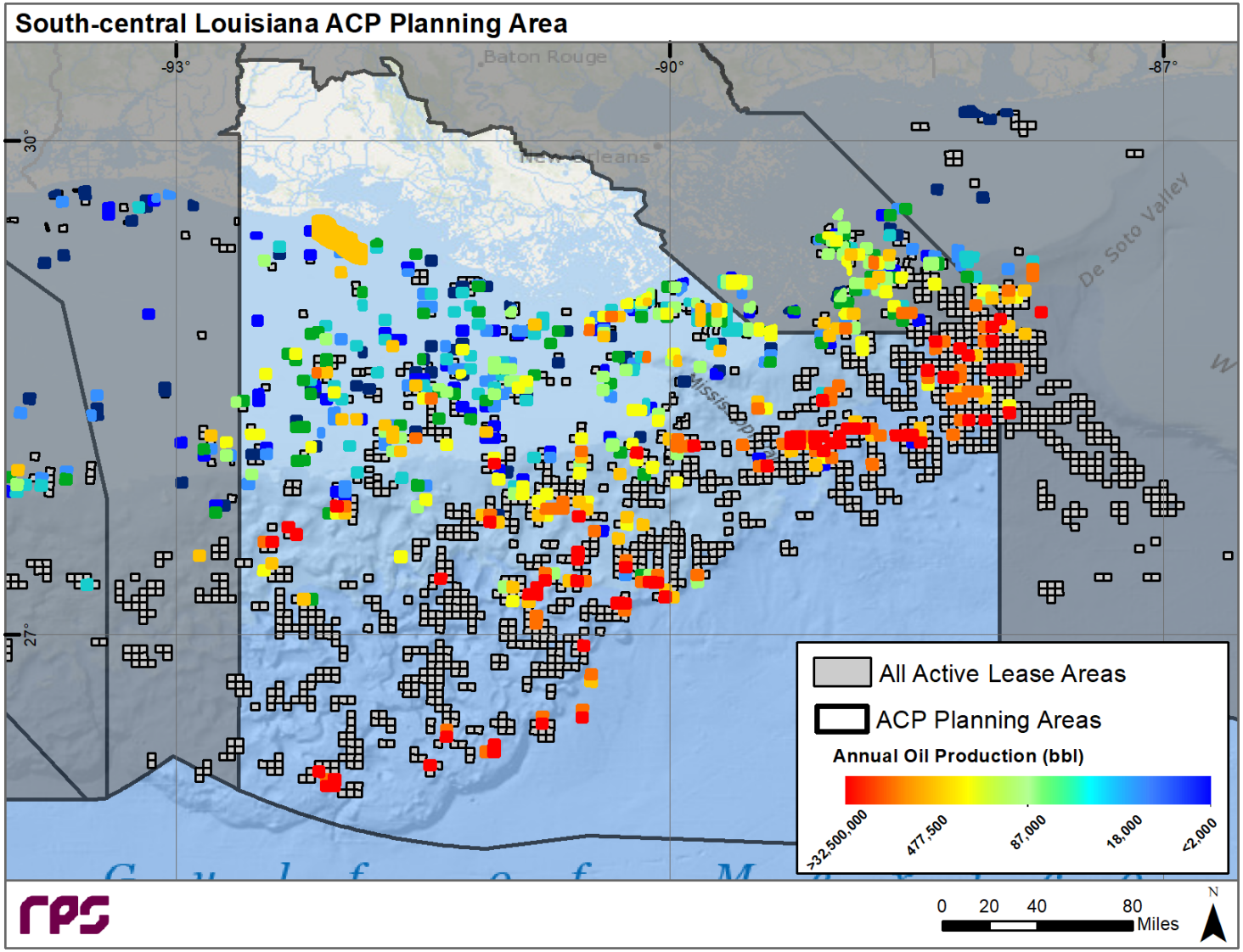

Figure 32. Highest-Producing Leases in South-central Louisiana ACP Planning Area.

8 Southeast Louisiana (New Orleans)

8.1 Oil and Gas Fields

The Southeast Louisiana (New Orleans) ACP Planning Area, comprised mostly of the Main Pass protraction area and the southern portion of Viosca Knoll, contains predominantly gas fields. Towards the west (West Delta area), oil and gas fields are equally distributed, while to the south, progressing into deeper water (including southern Main Pass and northernmost Mississippi Canyon), oil fields become more prevalent. Of the over 100 fields within this area, approximately one-third are structural traps associated with faulted anticlinal features, while another third is stratigraphic in nature. Hydrocarbon-bearing sands were identified between 4,500 to 18,000 feet subsea

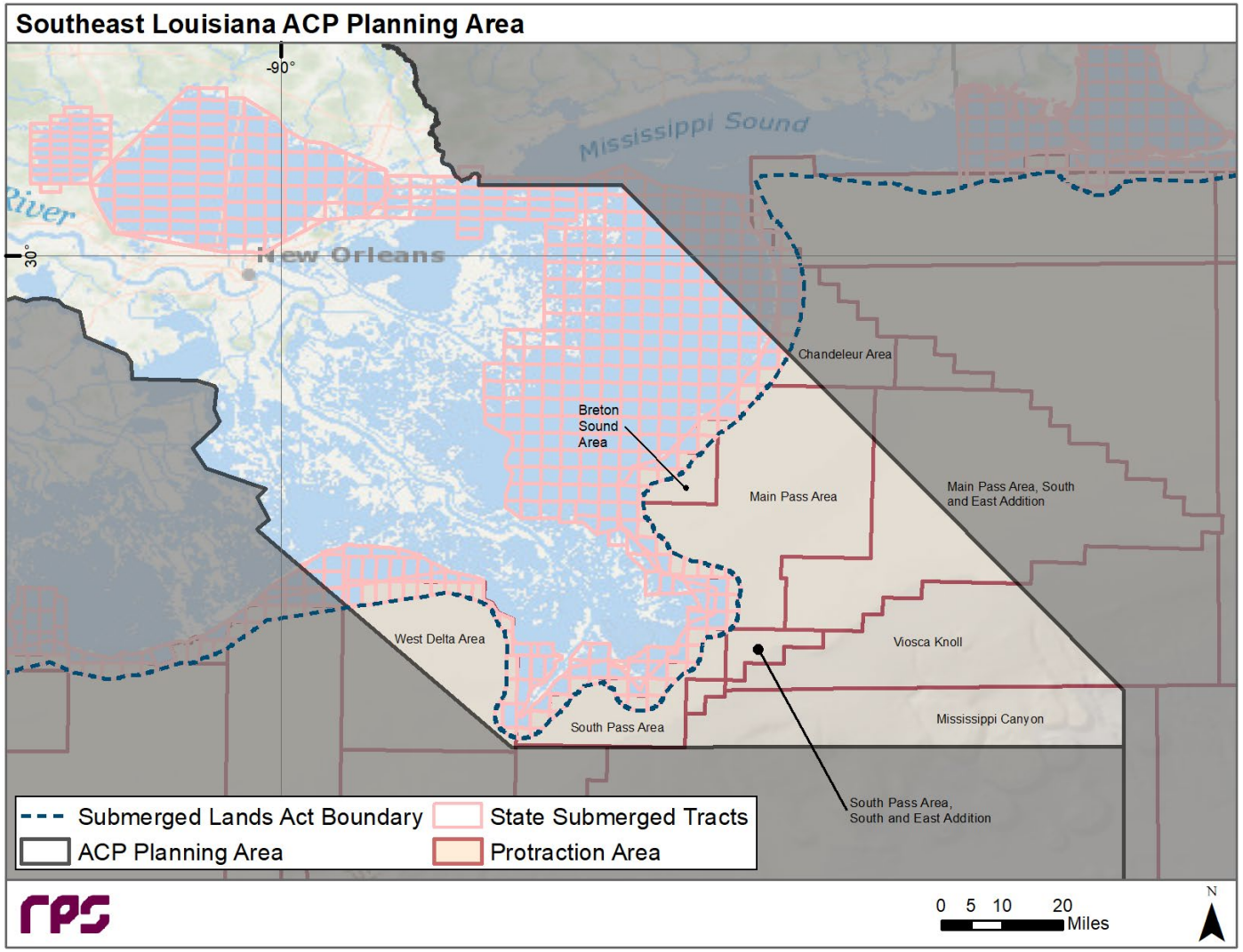

Figure 33. Protraction Areas in the Southeast Louisiana ACP Planning Area.

(Note: Lease blocks in LA waters align with OCS protraction names and numbers.)

8.2 Bathymetry

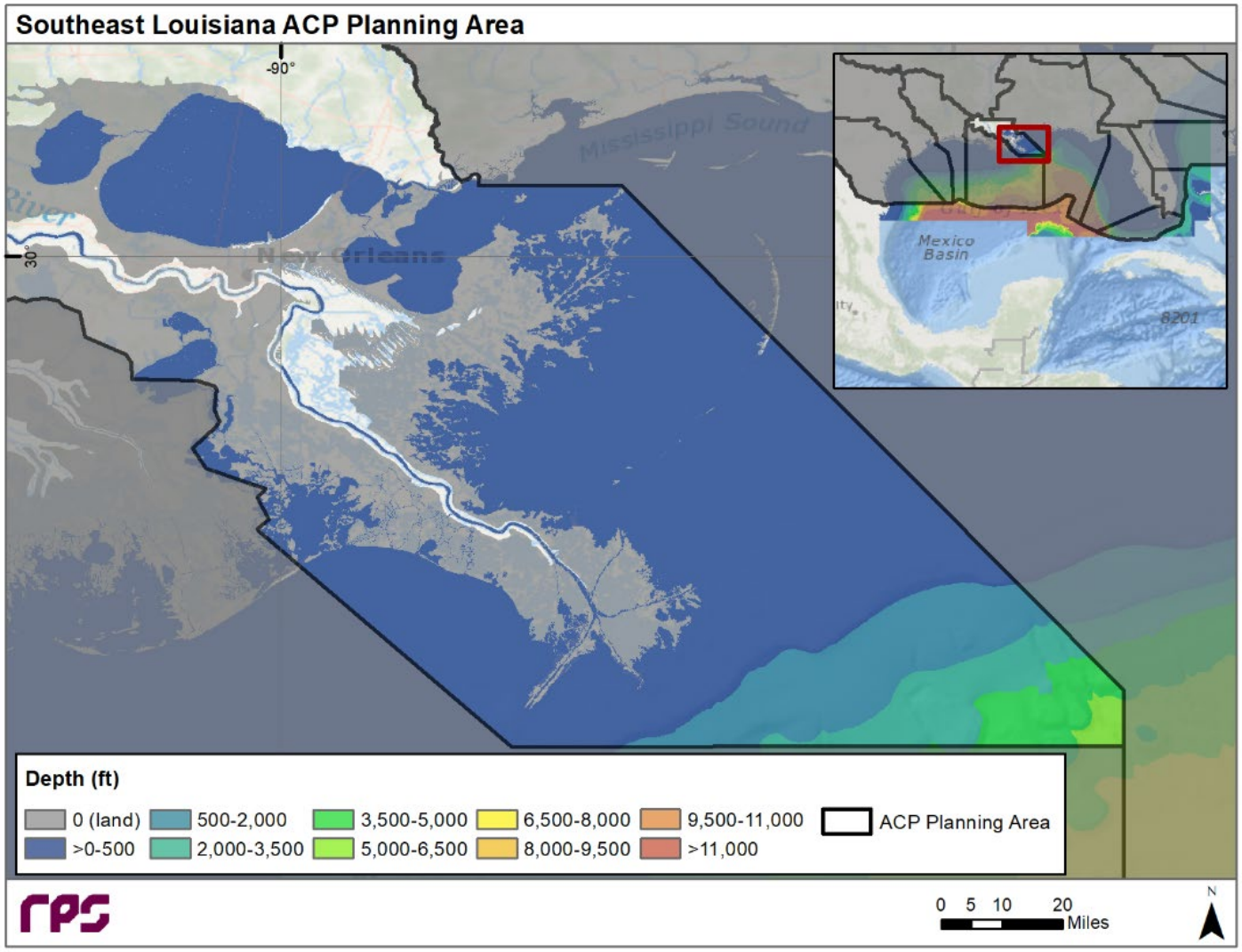

Figure 34. Bathymetry of Southeast Louisiana ACP Planning Area.

8.3 OCS Wells

The wells by status in the Southeast Louisiana ACP Planning Area are summarized in Table 31. A map of the active well by production type is shown in Figure 35. Shallow wells are classified by age in Table 32, and deepwater wells are classified by age in Table 33.

Table 31. Numbers of OCS Wells in Southeast Louisiana ACP Planning Area.

Location Depth	Well Status[30]		Total
	Active Wells	Permanently Abandoned	
Shallow	987	1,526	2,513
Deepwater	0	1	1
Total	987	1,527	2,514

Table 32. Age Categories of Shallow Wells in Southeast Louisiana by Well Status.

Well Status[31]	Total Wells (by Age)			Total
	< 20 years	20–50 years	> 50 years	
Active Wells	275	522	190	987
Permanently Abandoned	157	946	423	1,526
Total Wells	432	1,468	613	2,513

Table 33. Age Categories of Deepwater Wells in Southeast Louisiana by Well Status.

Well Status[32]	Total Wells (by Age)			Total
	< 20 years	20–50 years	> 50 years	
Active Wells	0	0	0	0
Permanently Abandoned	1	0	0	1
Total Wells	1	0	0	1

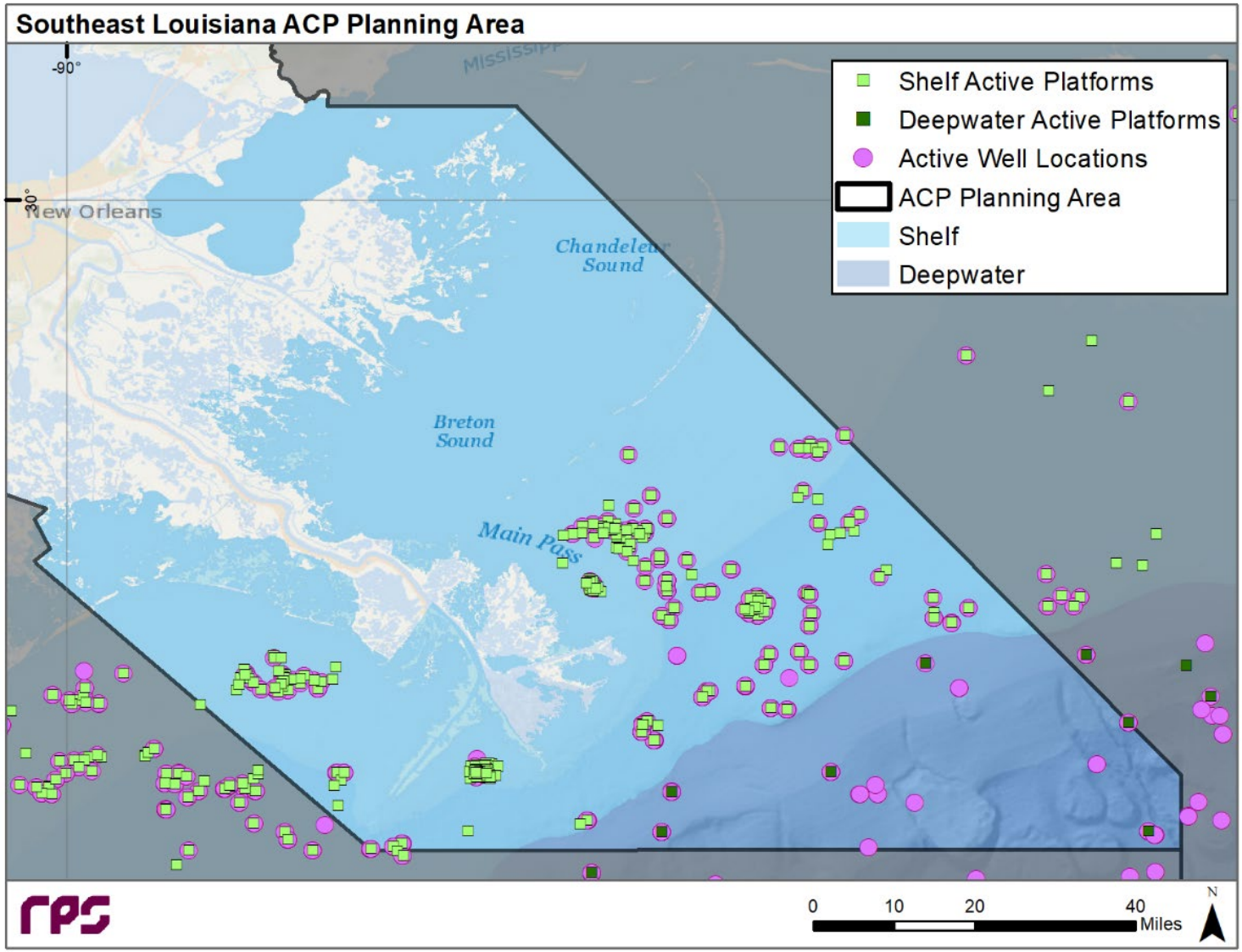

Figure 35. Active OCS Platforms and Wells in Southeast Louisiana ACP Planning Area.

8.4 ROW Pipelines

The ROW locations of pipelines that cross through the Southeast Louisiana ACP Planning Area are shown in Figure 36. To avoid cluttering the figure, lease term pipelines, which are pipelines contained within a single lease or a group of leases, are not shown. Examples of lease term pipelines are lines that connect between platforms or tie platforms into ROW pipelines.

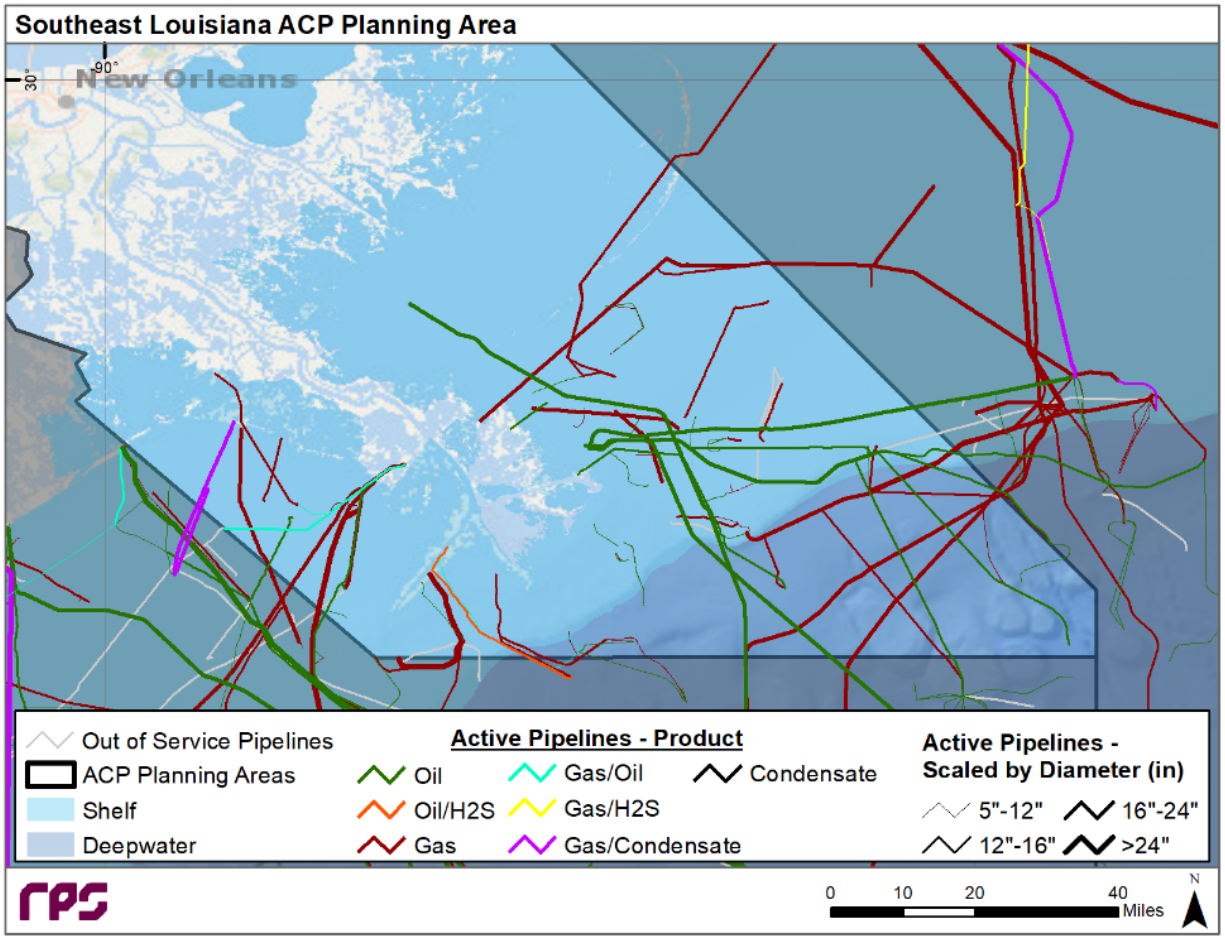

Figure 36. ROW Pipelines in Southeast Louisiana ACP Planning Area.

8.5 Offshore Oil and Gas Production

Offshore oil and gas production in the Southeast Louisiana ACP Planning Area is summarized in Table 34. Each year, nearly 27 million bbl of oil and over 33 million mcf of gas are produced. Most of the oil (nearly 66%) is produced in the deepwater areas. Most of the gas (over 52%) is produced in the shallow areas.

Table 34. Oil and Gas Production in Southeast Louisiana.

Location Type	Annual Oil Production (bbl)	Annual Gas Production (mcf)
Shallow	9,245,888	17,470,698
Deepwater	17,627,923	15,940,896
Total	**26,873,811**	**33,411,594**

8.5.1 Highest-Producing Leases

The highest-producing oil and gas leases in the Southeast Louisiana ACP Planning Area are shown in Table 35 and Table 36, respectively. The locations of the highest-producing leases are shown in the map in Figure 37.

Table 35. Highest-Producing Oil Leases in Southeast Louisiana.[10]

Lease Number	Area-Block	Depth Category	Annual Production	
			Oil + Condensate (bbl)	Gas in Same Lease (mcf)
G19925	MC127	Deepwater	10,521,087	5,571,928
G13997	MC29	Deepwater	1,748,583	2,677,968
G09771	MC28	Deepwater	1,616,753	1,480,771
G33701	VK999	Deepwater	870,632	2,725,332
G01316	MP299	Shallow	794,123	707,862

Table 36. Highest-Producing Gas Leases in Southeast Louisiana.

Lease Number	Area-Block	Depth Category	Annual Production	
			Gas (mcf)	Oil + Condensate in Same Lease (bbl)
G19925	MC127	Deepwater	5,571,928	10,521,087
G04832	MP108	Shallow	2,825,023	50,909
G33701	VK999	Deepwater	2,725,332	870,632
G13997	MC29	Deepwater	2,677,968	1,748,583
G09771	MC28	Deepwater	1,480,771	1,616,753

[10] Based on BSEE data for 31 October 2019–30 November 2020.

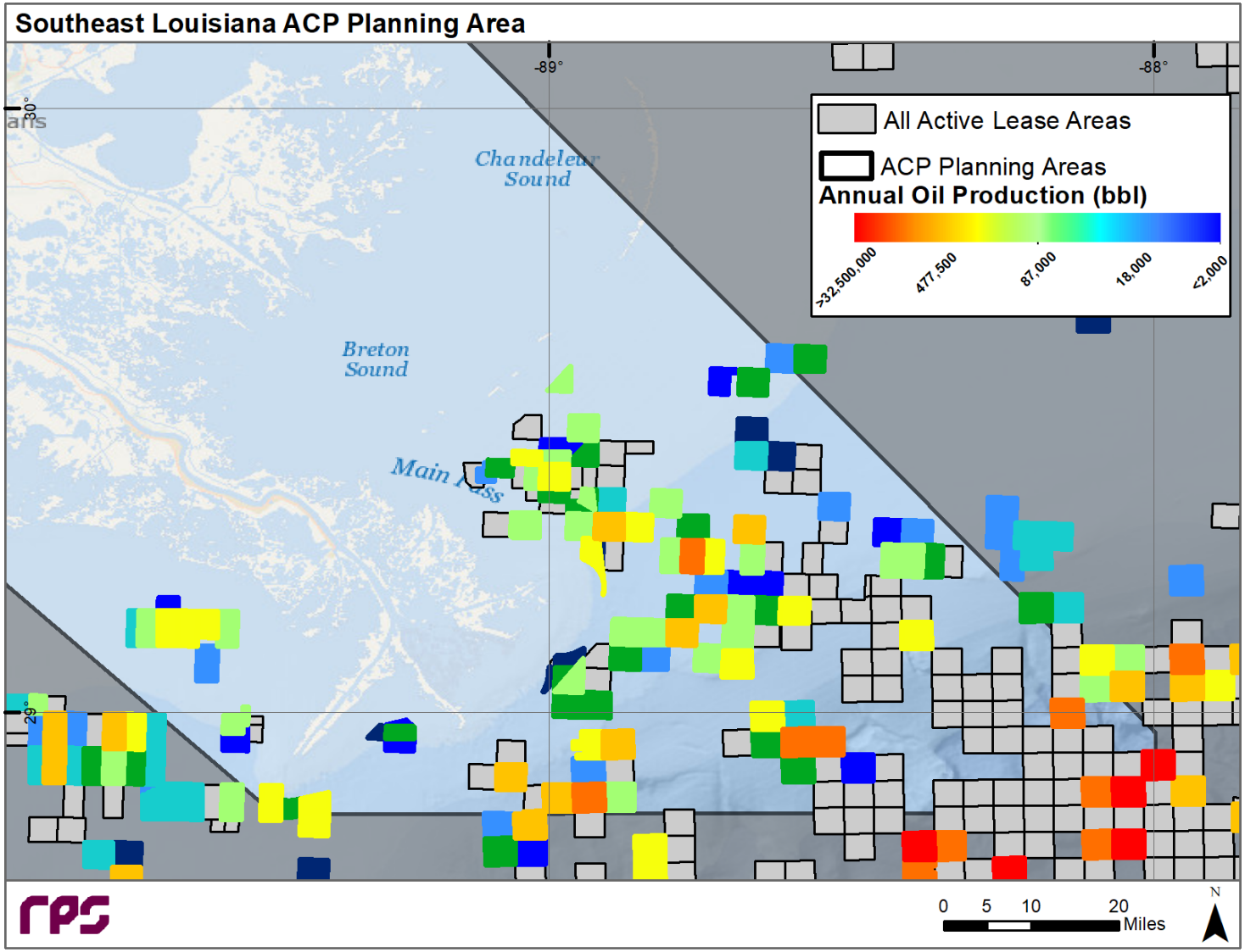

Figure 37. Highest-Producing Leases in the Southeast Louisiana ACP Planning Area.

9 Alabama, Mississippi, and Northwest Florida (Mobile)

9.1 Oil and Gas Fields

Fields in the Alabama, Mississippi, and Northwest Florida (Mobile) ACP Planning Area are located in the Mobile protraction area, Main Pass (South and East Addition), and the northern and southeastern area of Viosca Knoll. The eastern portion of the area falls under the Gulf of Mexico Energy Security Act of 2006, because it lies to the east of the military mission line. Gas fields comprise approximately 85% of the fields in this area. The oil fields appear in the southernmost Main Pass and Viosca Knoll areas, as well as Destin Dome and the small slivers of Mississippi Canyon and Atwater Valley included in the area. Of the nearly 170 fields, approximately 70% are stratigraphically trapped, with the remaining fields evenly divided between faulted anticlinal traps and those associated with a salt feature. Hydrocarbon-bearing sands were identified between 1,000 to 28,500 feet subsea

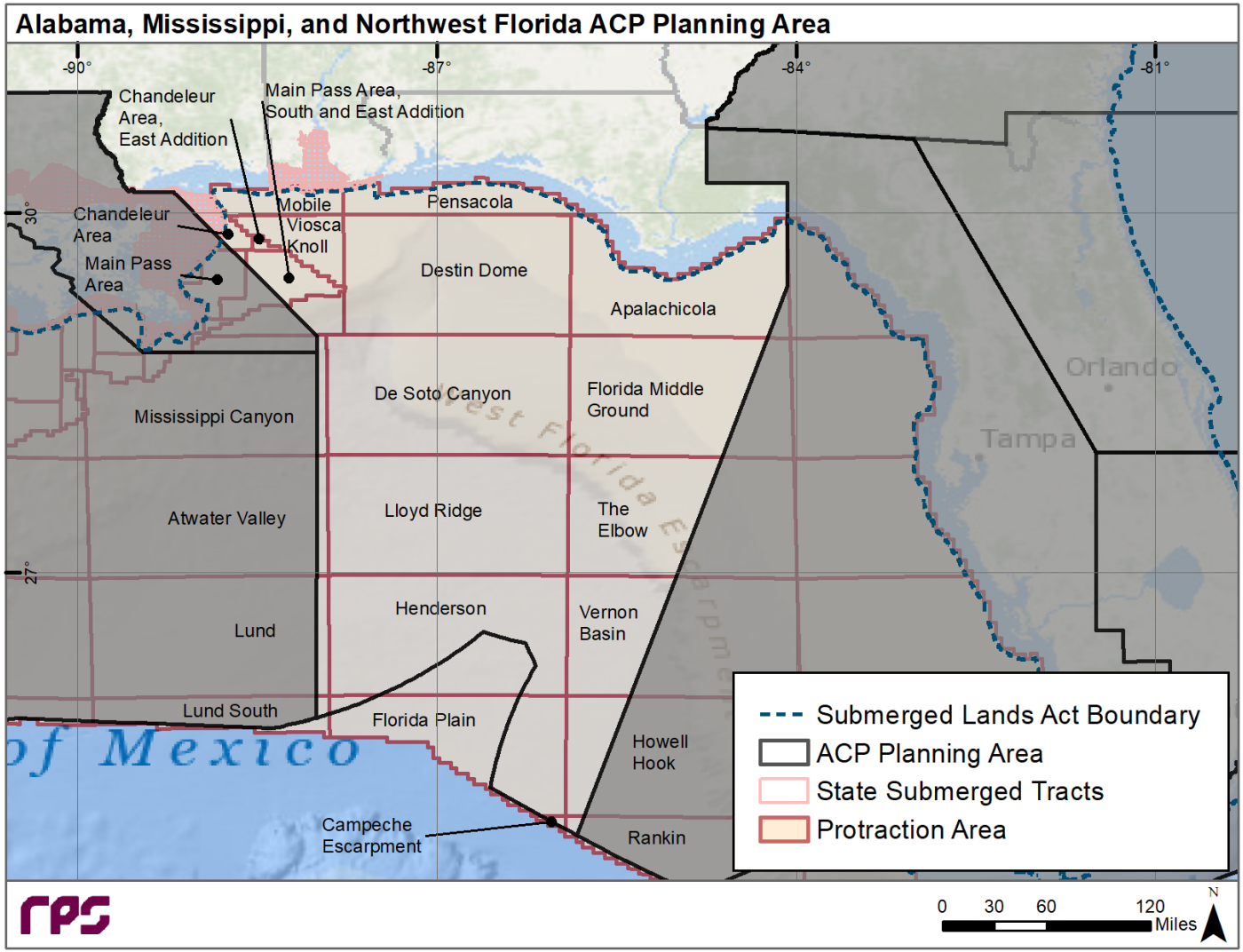

Figure 38. Protraction Areas in the Alabama, Mississippi, & Northwest Florida ACP Planning Area.

(Note: Lease blocks in Mississippi and Alabama waters use state-specific numbering systems.)

9.2 Bathymetry

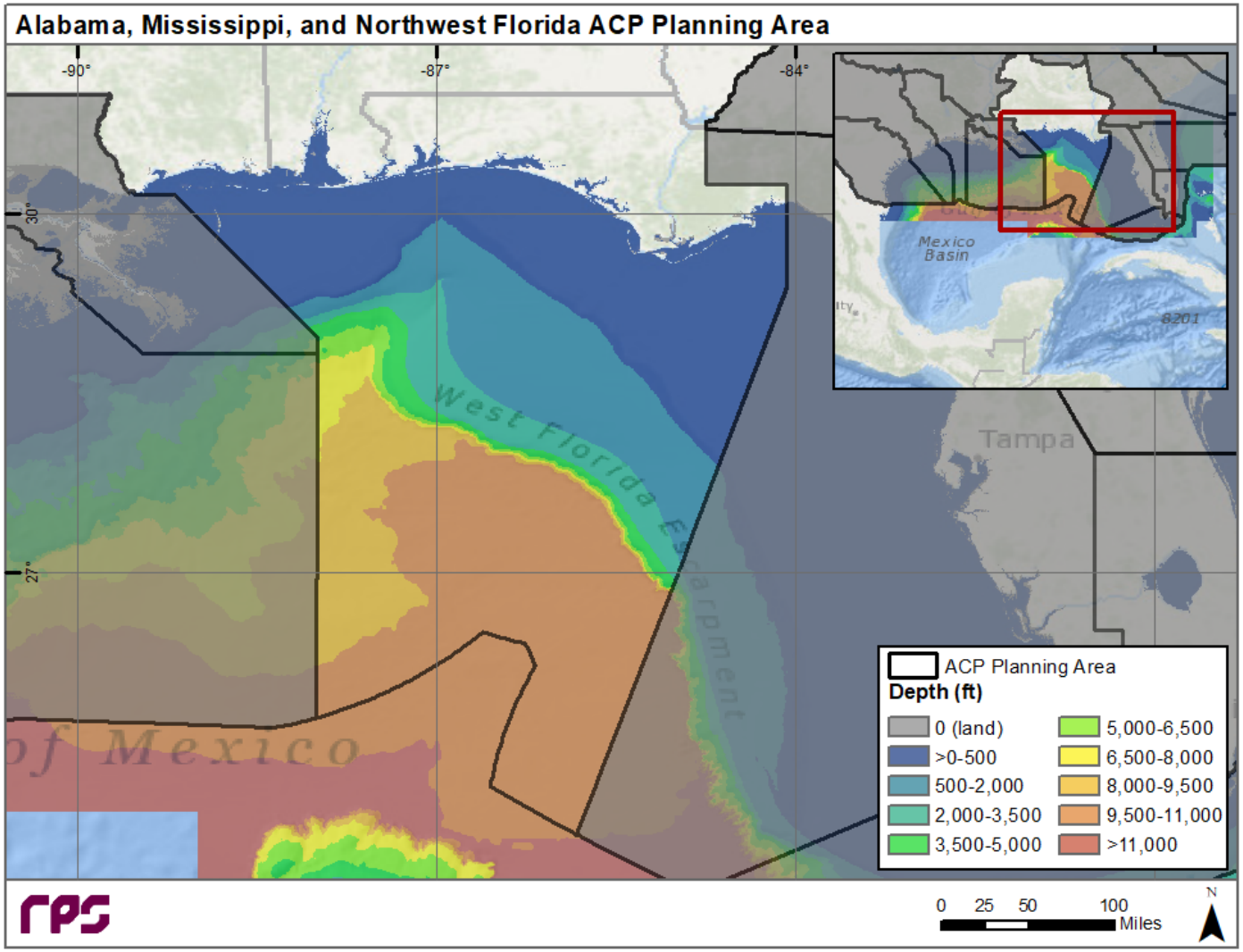

Figure 39. Bathymetry of Alabama, Mississippi, & Northwest Florida ACP Planning Area.

9.3 OCS Wells

The wells by status in the Alabama, Mississippi, and Northwest Florida ACP Planning Area are summarized in Table 37. A map of the active well locations by production type is shown in Figure 40. Shallow wells are classified by age in Table 38, and deepwater wells are classified by age in Table 39.

Table 37. Numbers of OCS Wells in Alabama, Mississippi, & Northwest Florida.

Location Depth	Well Status[34]		Total
	Active Wells	Permanently Abandoned	
Shallow	68	289	357
Deepwater	125	162	287
Total	193	451	644

Table 38. Age Categories of Shallow Wells in Alabama, Mississippi, & Northwest Florida by Well Status.

Well Status[35]	Total Wells (by Age)			Total
	< 20 years	20–50 years	> 50 years	
Active Wells	15	53	0	68
Permanently Abandoned	48	241	0	289
Total Wells	63	294	0	357

Table 39. Age Categories of Deepwater Wells in Alabama, Mississippi, & Northwest Florida by Well Status.

Well Status[36]	Total Wells (by Age)			Total
	< 20 years	20–50 years	> 50 years	
Active Wells	44	81	0	125
Permanently Abandoned	55	107	0	162
Total Wells	99	188	0	287

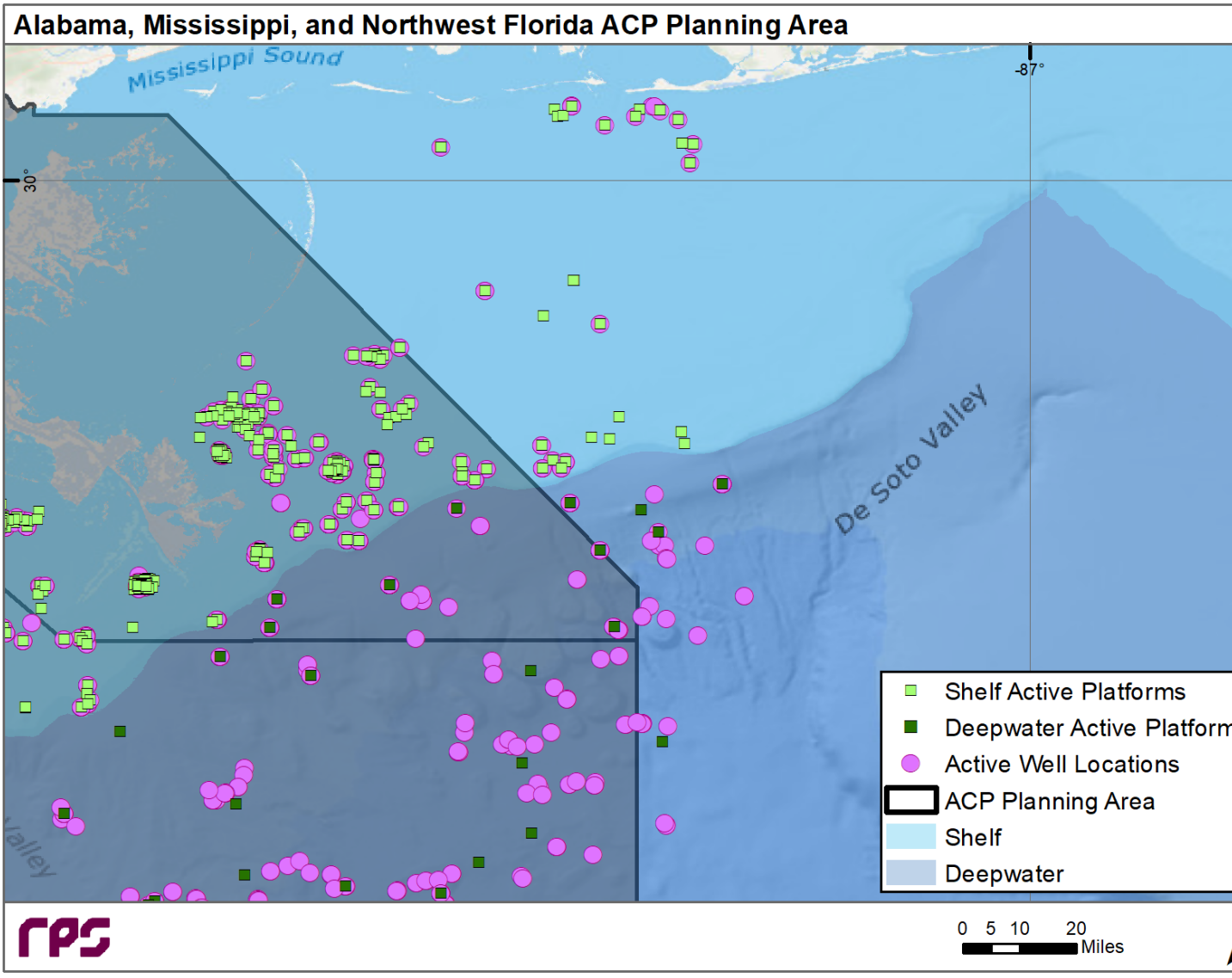

Figure 40. Active OCS Platforms and Wells in Alabama, Mississippi, & Northwest Florida ACP Planning Area.

9.4 ROW Pipelines

The locations of ROW pipelines that cross through the Alabama, Mississippi, and Northwest Florida ACP Planning Area are shown in Figure 41. To avoid cluttering the figure, lease term pipelines, which are pipelines contained within a single lease or a group of leases, are not shown. Examples of lease term pipelines are lines that connect between platforms or tie platforms into ROW pipelines. The prominent pipeline extending across the entire ACP Planning Area in Figure 41 is the Gulfstream Natural Gas Pipeline. This pipeline is a 36-inch high pressure natural gas pipeline that carries gas from onshore in the Mobile Bay area to onshore in the Tampa, Florida area for distribution. It has a transmission capacity of 1.29 billion cubic feet of natural gas per day. The offshore segment that traverses the Gulf stretches approximately 419 miles (674.3 km). It is the longest pipeline in the GOM. It was put into commercial operation in June 2002.

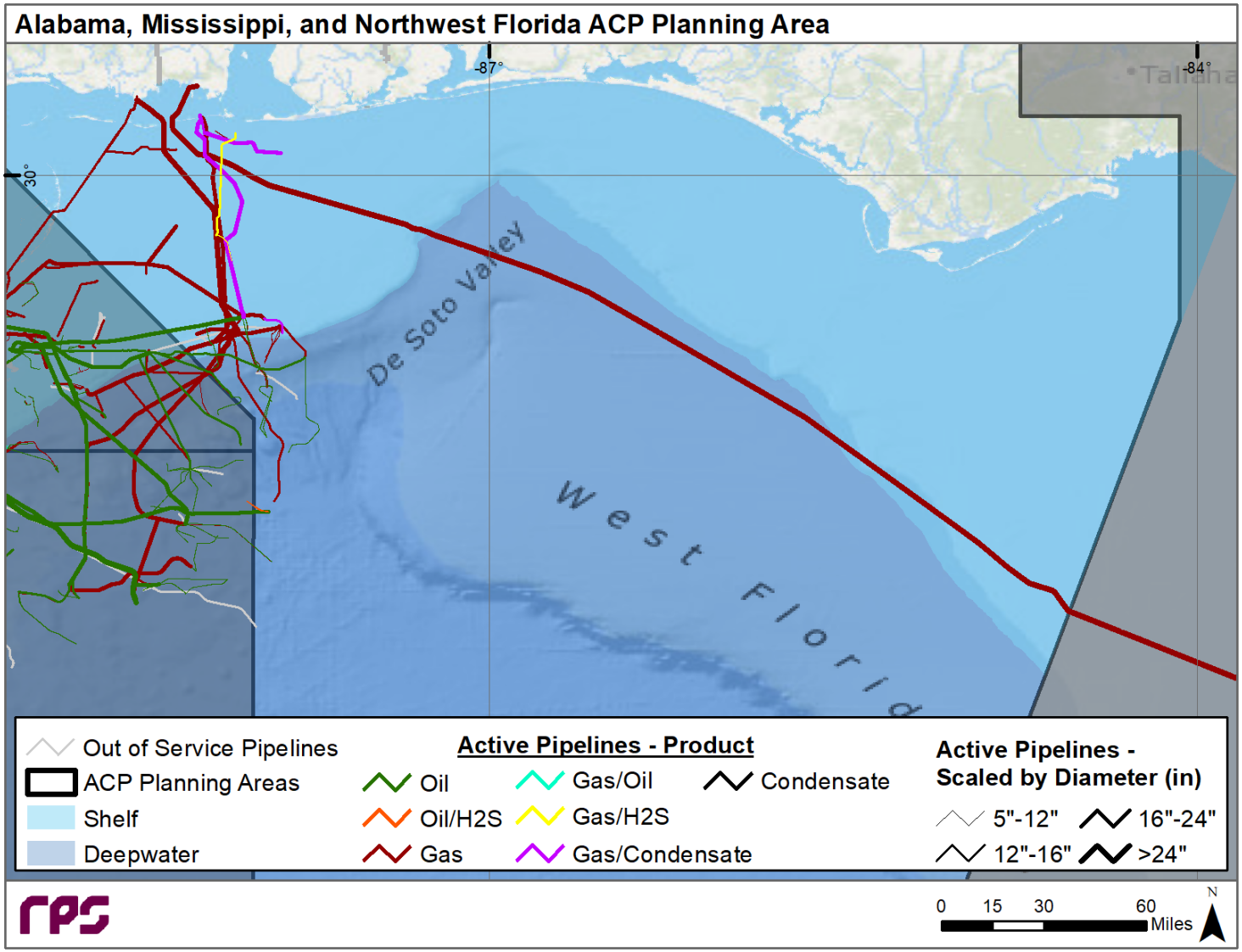

Figure 41. ROW Pipelines in Alabama, Mississippi, & Northwest Florida ACP Planning Area.

9.5 Offshore Production

Offshore oil and gas production in the Alabama, Mississippi, and Northwest Florida ACP Planning area is summarized in Table 40. Each year, nearly 32 million bbl of oil and over 79 million mcf of gas are produced. Most of the oil (over 99%) is produced in the deepwater areas. Most of the gas (nearly 56%) is also produced in the deepwater areas.

Table 40. Oil and Gas Production in Alabama, Mississippi, & Northwest Florida.

Location Type	Annual Oil Production (bbl)	Annual Gas Production (mcf)
Shallow	179,918	35,187,135
Deepwater	31,752,986	44,284,638
Total	**31,932,904**	**79,471,773**

9.5.1 Highest-Producing Leases

The highest-producing oil and gas leases in the Alabama, Mississippi, and Northwest Florida ACP Planning Area are shown in Table 41 and Table 42, respectively. The locations of the highest-producing leases are shown in the map in Figure 42.

Table 41. Highest-Producing Oil Leases in Alabama, Mississippi, & Northwest Florida.

Lease Number	Area-Block	Depth Category	Annual Production	
			Oil + Condensate (bbl)	Gas in Same Lease (mcf)
G26253	MC392	Deepwater	12,047,261	7,472,141
G26254	MC393	Deepwater	6,138,138	3,342,921
G10437	DC4	Deepwater	3,569,952	3,772,620
G08484	MC84	Deepwater	3,137,412	3,469,677
G08496	MC657	Deepwater	2,322,601	8,132,433

Table 42. Highest-Producing Gas Leases in Alabama, Mississippi, & Northwest Florida.

Lease Number	Area-Block	Depth Category	Annual Production	
			Gas (mcf)	Oil + Condensate in Same Lease (bbl)
G05057	Multiple[37]	Shallow	14,710,356	4,113
G08496	MC657	Deepwater	8,132,433	2,322,601
G26253	MC392	Deepwater	7,472,141	12,047,261
G05749	MO904	Shallow	5,757,565	0
G19974	MC613	Deepwater	5,400,786	168,750

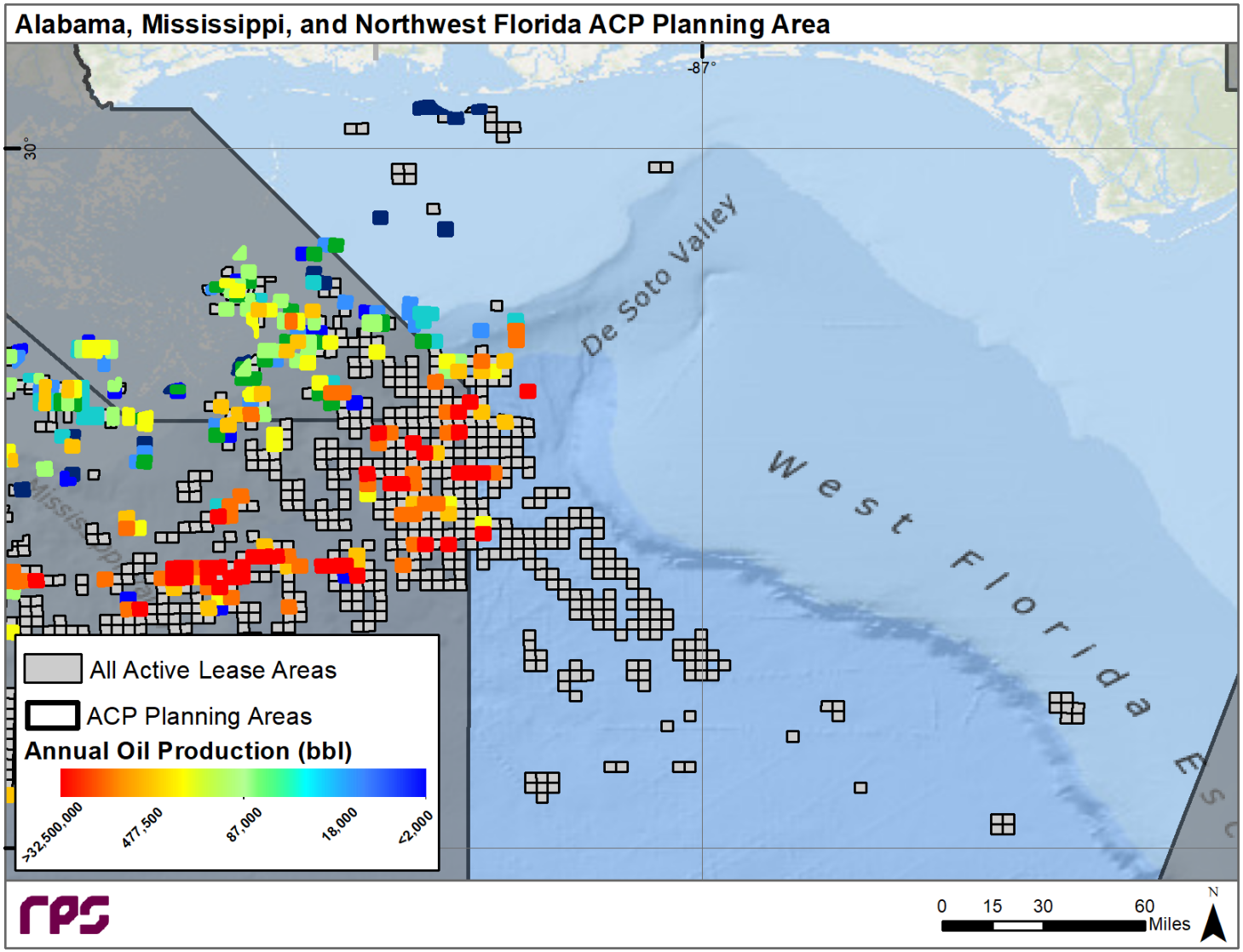

Figure 42. Highest-Producing Leases in Alabama, Mississippi, & Northwest Florida ACP Planning Area.