

3.0 RESULTS

The results of the inventory are presented below, summarized by access category for land area and resources and grouped by study area. Table 3-1 shows the combined results for all 11 study areas, while Tables 3-2 through 3-12 show the results for individual study areas. Also depicted on the bottom of each table is a simplified summary showing accessibility of oil and gas resources. The tables show the results for Federal land access categorization by land area, total oil (used generically to include oil, NGLs, and liquids associated with gas reservoirs), and total natural gas (associated and non-associated with oil reservoirs). Oil and natural gas totals include undiscovered technically recoverable and reserves growth resources. Figures 3-1 through 3-57 show the corresponding pie charts depicting the simplified and the nine-category access hierarchy, the Federal land access categorization maps for each study area, and the corresponding maps showing undiscovered oil and natural gas resources on Federal lands.

Table 3-1. Summary of All Phase II Study Areas—Federal Land and Oil and Natural Gas Resources by Access Category

Figure 3-1. Simplified Chart of Results, Summary of All Phase II Study Areas—Federal Land and Oil and Natural Gas Resources

Figure 3-2. Chart of Results, Summary of All Phase II Study Areas—Federal Land and Oil and Natural Gas Resources by Access Category

3.1 STUDY AREA FEATURES

Each of the study areas is unique in terms of its Federal land and resources accessibility. Noteworthy features are presented below.

3.1.1 Northern Alaska (NPR-A and ANWR 1002 only)

- None of the Federal land in this study area is accessible under standard lease terms (Figures 3-3 and 3-4, Category 9).
- Approximately 43 percent (10.4 million acres) of the Federal land is accessible with restrictions on oil and gas operations beyond standard lease terms (Figures 3-3 and 3-4, Categories 5 through 8). Based on resource estimates, these lands contain 41 percent (6.9 Bbbls) of the technically recoverable Federal oil and 51 percent (33.3 TCF) of the technically recoverable Federal natural gas.
- Approximately 57 percent (13.9 million acres) of the Federal land is not accessible (Figures 3-3 and 3-4, Categories 1 through 4). Based on resource estimates, these lands contain about 59 percent (10.2 Bbbls) of the technically recoverable Federal oil and 49 percent (32.2 TCF) of the technically recoverable Federal natural gas.
- Only conventional resources have been assessed for Northern Alaska. Continuous resources (See Section 2.2.1.1) will be included in a future USGS assessment.

Reserves growth has not been estimated for this study area.

- Although the Federal portion of NPR-A (22.5 million acres) is about 15 times larger in surface area than the Federal portion of ANWR 1002 (1.5 million acres), it is estimated to contain only about 1.2 times as much oil (9.3 Bbbls versus 7.7 Bbbls).

Table 3-2. Northern Alaska Study Area—Federal Land and Oil and Natural Gas Resources by Access Category

Figure 3-3. Simplified Chart of Results, Northern Alaska Study Area—Federal Land and Oil and Natural Gas Resources by Accessibility

Figure 3-4. Chart of Results, Northern Alaska Study Area—Federal Land and Oil and Natural Gas Resources by Access Category

Figure 3-5. Federal Land Access Categorization Map, Northern Alaska Study Area

Figure 3-6. Map of Total Federal Oil, Northern Alaska Study Area

Figure 3-7. Map of Total Federal Natural Gas, Northern Alaska Study Area

3.1.2 Uinta-Piceance Basin

- Approximately 38 percent (4.9 million acres) of the Federal land is accessible under standard lease terms (Figures 3-8 and 3-9, Category 9). Based on resource estimates, these lands contain 28 percent (36 MMbbls) of the Federal oil and 24 percent (3.1 TCF) of the Federal natural gas.
- Approximately 27 percent (3.6 million acres) of the Federal land is accessible with restrictions on oil and gas operations beyond standard lease terms (Figures 3-8 and 3-9, Categories 5 through 8). Based on resource estimates, these lands contain 56 percent (72 MMbbls) of the Federal oil and 61 percent (7.8 TCF) of the Federal natural gas in the basin.
- Approximately 35 percent (4.6 million acres) of the Federal land is not accessible (Figures 3-8 and 3-9, Categories 1 through 4). Based on resource estimates, these lands contain about 17 percent (22 MMbbls) of the Federal oil and 15 percent (1.9 TCF) of the Federal natural gas.
- Most of the undiscovered natural gas (greater than 95 percent) is expected to occur as continuous resources.

Table 3-3. Uinta-Piceance Basin Study Area—Federal Land and Oil and Natural Gas Resources by Access Category

Figure 3-8. Simplified Chart of Results, Uinta-Piceance Basin Study Area—Federal Land and Oil and Natural Gas Resources by Accessibility

Figure 3-9. Chart of Results, Uinta-Piceance Basin Study Area—Federal Land and Oil and Natural Gas Resources by Access Category

Figure 3-10. Federal Land Access Categorization Map, Uinta-Piceance Basin Study Area

Figure 3-11. Map of Total Federal Oil, Uinta-Piceance Basin Study Area

Figure 3-12. Map of Total Federal Natural Gas, Uinta-Piceance Basin Study Area

3.1.3 Paradox/San Juan Basins

- Approximately 40 percent (7.0 million acres) of the Federal land is accessible under standard lease terms (Figures 3-13 and 3-14, Category 9). Based on resource estimates, these lands contain 38 percent (156 MMbbls) of the Federal oil and 39 percent (10.5 TCF) of the Federal natural gas.
- Approximately 11 percent (1.9 million acres) of the Federal land is accessible with restrictions on oil and gas operations beyond standard lease terms (Figures 3-13 and 3-14, Categories 5 through 8). Based on resource estimates, these lands contain 39 percent (159 MMbbls) of the Federal oil and 54 percent (14.7 TCF) of the Federal natural gas.
- Approximately 49 percent (8.7 million acres) of the Federal land is not accessible (Figures 3-13 and 3-14, Categories 1 through 4). Based on resource estimates, these lands contain about 23 percent (96 MMbbls) of the Federal oil and 7 percent (2.0 TCF) of the Federal natural gas.
- Most of the undiscovered natural gas (approximately 95 percent) is expected to occur as continuous resources.

Table 3-4. Paradox/San Juan Basins Study Area—Federal Land and Oil and Natural Gas Resources by Access Category

Figure 3-13. Simplified Chart of Results, Paradox/San Juan Basins Study Area—Federal Land and Oil and Natural Gas Resources by Accessibility

Figure 3-14. Chart of Results, Paradox/San Juan Basins Study Area—Federal Land and Oil and Natural Gas Resources by Access Category

Figure 3-15. Federal Land Access Categorization Map, Paradox/San Juan Basins Study Area

Figure 3-16. Map of Total Federal Oil, Paradox/San Juan Basins Study Area

Figure 3-17. Map of Total Federal Natural Gas, Paradox/San Juan Basins Study Area

3.1.4 Montana Thrust Belt

- Approximately 3 percent (0.2 million acres) of the Federal land is accessible under standard lease terms (Figures 3-18 and 3-19, Category 9). Based on resource

estimates, these lands contain 2 percent (3 MMbbls) of the Federal oil and 1 percent (0.07 TCF) of the Federal natural gas.

- Approximately 5 percent (0.3 million acres) of the Federal land is accessible with restrictions on oil and gas operations beyond standard lease terms (Figures 3-18 and 3-19, Categories 5 through 8). Based on resource estimates, these lands contain 6 percent (10 MMbbls) of the Federal oil and 4 percent (0.27 TCF) of the Federal natural gas.
- Approximately 92 percent (5.2 million acres) of the Federal land is not accessible (Figures 3-18 and 3-19, Categories 1 through 4). Based on resource estimates, these lands contain about 92 percent (158 MMbbls) of the Federal oil and 95 percent (6.0 TCF) of the Federal natural gas.
- The USDA-Forest Service is the primary land management agency in the Montana Thrust Belt, with 71 percent of the Federal lands. Almost half is currently not being leased while undergoing new land use planning.

Table 3-5. Montana Thrust Belt Study Area—Federal Land and Oil and Natural Gas Resources by Access Category

Figure 3-18. Simplified Chart of Results, Montana Thrust Belt Study Area—Federal Land and Oil and Natural Gas Resources by Accessibility

Figure 3-19. Chart of Results, Montana Thrust Belt Study Area—Federal Land and Oil and Natural Gas Resources by Access Category

Figure 3-20. Federal Land Access Categorization Map, Montana Thrust Belt Study Area

Figure 3-21. Map of Total Federal Oil, Montana Thrust Belt Study Area

Figure 3-22. Map of Total Federal Natural Gas, Montana Thrust Belt Study Area

3.1.5 Powder River Basin

- Approximately 49 percent (5.8 million acres) of the Federal land is accessible under standard lease terms (Figures 3-23 and 3-24, Category 9). Based on resource estimates, these lands contain 22 percent (198 MMbbls) of the Federal oil and 19 percent (1.7 TCF) of the Federal natural gas.
- Approximately 32 percent (3.9 million acres) of the Federal land is accessible with restrictions on oil and gas operations beyond standard lease terms (Figures 3-23 and 3-24, Categories 5 through 8). Based on resource estimates, these lands contain 74 percent (668 MMbbls) of the Federal oil and 71 percent (6.2 TCF) of the Federal natural gas in the basin.
- Approximately 19 percent (2.3 million acres) of the Federal land is not accessible (Figures 3-23 and 3-24, Categories 1 through 4). Based on resource estimates, these lands contain about 4 percent (32 MMbbls) of the Federal oil and 10 percent (0.87 TCF) of the Federal natural gas.

- Almost all of the undiscovered natural gas is expected to be found in coalbeds (98 percent).
- Among the study areas, this area has the highest proportion of split estate lands (59 percent of the Federal oil and gas ownership is split estate).

Table 3-6. Powder River Basin Study Area—Federal Land and Oil and Natural Gas Resources by Access Category

Figure 3-23. Simplified Chart of Results, Powder River Basin Study Area—Federal Land and Oil and Natural Gas Resources by Accessibility

Figure 3-24. Chart of Results, Powder River Basin Study Area—Federal Land and Oil and Natural Gas Resources by Access Category

Figure 3-25. Federal Land Access Categorization Map, Powder River Basin Study Area

Figure 3-26. Map of Total Federal Oil, Powder River Basin Study Area

Figure 3-27. Map of Total Federal Natural Gas, Powder River Basin Study Area

3.1.6 Wyoming Thrust Belt

- Approximately 13 percent (0.6 million acres) of the Federal land is accessible under standard lease terms (Figures 3-28 and 3-29, Category 9). Based on resource estimates, these lands contain 16 percent (7 MMbbls) of the Federal oil and 14 percent (0.05 TCF) of the Federal natural gas.
- Approximately 17 percent (0.7 million acres) of the Federal land is accessible with restrictions on oil and gas operations beyond standard lease terms (Figures 3-28 and 3-29, Categories 5 through 8). Based on resource estimates, these lands contain 31 percent (14 MMbbls) of the Federal oil and 46 percent (0.17 TCF) of the Federal natural gas.
- Approximately 69 percent (2.9 million acres) of the Federal land is not accessible (Figures 3-28 and 3-29, Categories 1 through 4). Based on resource estimates, these lands contain about 53 percent (24 MMbbls) of the Federal oil and 40 percent (0.15 TCF) of the Federal natural gas.

Table 3-7. Wyoming Thrust Belt Study Area—Federal Land and Oil and Natural Gas Resources Affected by Access Category

Figure 3-28. Simplified Chart of Results, Wyoming Thrust Belt Study Area—Federal Land and Oil and Natural Gas Resources by Accessibility

Figure 3-29. Chart of Results, Wyoming Thrust Belt Study Area—Federal Land and Oil and Natural Gas Resources by Access Category

Figure 3-30. Federal Land Access Categorization Map, Wyoming Thrust Belt Study Area

Figure 3-31. Map of Total Federal Oil, Wyoming Thrust Belt Study Area

Figure 3-32. Map of Total Federal Natural Gas, Wyoming Thrust Belt Study Area

3.1.7 Greater Green River Basin (Southwestern Wyoming)

- Approximately 30 percent (3.5 million acres) of the Federal land is accessible under standard lease terms (Figures 3-33 and 3-34, Category 9). Based on resource estimates, these lands contain 14 percent (335 MMbbls) of the Federal oil and 15 percent (9.4 TCF) of the Federal natural gas.
- Approximately 50 percent (5.7 million acres) of the Federal land is accessible with restrictions on oil and gas operations beyond standard lease terms (Figures 3-33 and 3-34, Categories 5 through 8). Based on resource estimates, these lands contain 77 percent (1,828 MMbbls) of the Federal oil and 76 percent (47.8 TCF) of the Federal natural gas.
- Approximately 20 percent (2.2 million acres) of the Federal land in the basin is not accessible (Figures 3-33 and 3-34, Categories 1 through 4). Based on resource estimates, these lands contain about 9 percent (213 MMbbls) of the Federal oil and 9 percent (5.6 TCF) of the Federal natural gas.
- Almost all of the undiscovered natural gas (97 percent) is expected to occur as continuous deposits.
- A relatively large portion of the Federal land (43 percent of the surface area,) along with 44 percent of the oil and 43 percent of the natural gas, are under timing limitations of 3 to 9 months.
- The land ownership pattern is highly complex due a checkerboard pattern of ownership resulting from railroad land grants.

Table 3-8. Greater Green River Basin Study Area—Federal Land and Oil and Natural Gas Resources by Access Category

Figure 3-33. Simplified Chart of Results, Greater Green River Basin Study Area—Federal Land and Oil and Natural Gas Resources by Accessibility

Figure 3-34. Chart of Results, Greater Green River Basin Study Area—Federal Land and Oil and Natural Gas Resources by Access Category

Figure 3-35. Federal Land Access Categorization Map, Greater Green River Basin Study Area

Figure 3-36. Map of Total Federal Oil, Greater Green River Basin Study Area

Figure 3-37. Map of Total Federal Natural Gas, Greater Green River Basin Study Area

3.1.8 Denver Basin

- Approximately 32 percent (0.9 million acres) of the Federal land is accessible under standard lease terms (Figures 3-38 and 3-39, Category 9). Based on resource estimates, these lands contain 16 percent (2 MMbbls) of the Federal oil and 11 percent (0.01 TCF) of the Federal natural gas.
- Approximately 42 percent (1.18 million acres) of the Federal land is accessible with restrictions on oil and gas operations beyond standard lease terms (Figures 3-38 and 3-39, Categories 5 through 8). Based on resource estimates, these lands contain 68 percent (9 MMbbls) of the Federal oil and 58 percent (0.03 TCF) of the Federal natural gas.
- Approximately 25 percent (0.7 million acres) of the Federal land is not accessible (Figures 3-38 and 3-39, Categories 1 through 4). Based on resource estimates, these lands contain about 16 percent (2 MMbbls) of the Federal oil and 31 percent (0.02 TCF) of the Federal natural gas.

Table 3-9. Denver Basin Study Area—Federal Land and Oil and Natural Gas Resources by Access Category

Figure 3-38. Simplified Chart of Results, Denver Basin Study Area—Federal Land and Oil and Natural Gas Resources by Accessibility

Figure 3-39. Chart of Results, Denver Basin Study Area—Federal Land and Oil and Natural Gas Resources by Access Category

Figure 3-40. Federal Land Access Categorization Map, Denver Basin Study Area

Figure 3-41. Map of Total Federal Oil, Denver Basin Study Area

Figure 3-42. Map of Total Federal Natural Gas, Denver Basin Study Area

3.1.9 Florida Peninsula

- None of the Federal land in the study area is accessible under standard lease terms (Figures 3-43 and 3-44, Category 9).
- Approximately 6 percent (0.1 million acres) of the Federal land is accessible with restrictions on oil and gas operations beyond standard lease terms (Figures 3-43 and 3-44, Categories 5 through 8). Based on resource estimates, these lands contain 14 percent (11 MMbbls) of the Federal oil and 15 percent (0.05 TCF) of the Federal natural gas.
- Approximately 94 percent (1.88 million acres) of the Federal land is not accessible (Figures 3-43 and 3-44, Categories 1 through 4). Based on resource estimates, these lands contain about 86 percent (64 MMbbls) of the Federal oil and 85 percent (0.28 TCF) of the Federal natural gas.
- The Department of the Interior has agreed in principle to acquire the mineral rights under Big Cypress National Preserve, Florida Panther National Wildlife Refuge, and

Ten Thousand Islands National Wildlife Refuge from Collier Resources Company, virtually ensuring no new oil and gas development in the three areas.¹

Table 3-10. Florida Peninsula Study Area—Federal Land and Oil and Natural Gas Resources by Access Category

Figure 3-43. Simplified Chart of Results, Florida Peninsula Study Area—Federal Land and Oil and Natural Gas Resources by Accessibility

Figure 3-44. Chart of Results, Florida Peninsula Study Area—Federal Land and Oil and Natural Gas Resources by Access Category

Figure 3-45. Federal Land Access Categorization Map, Florida Peninsula Study Area

Figure 3-46. Map of Total Federal Oil, Florida Peninsula Study Area

Figure 3-47. Map of Total Federal Natural Gas, Florida Peninsula Study Area

3.1.10 Black Warrior Basin

- The Federal lands in this study area contain only about 1 MMBbls of oil out of a total of 13 MMBbls for all lands.
- Approximately 3 percent (0.02 million acres) of the Federal land is accessible under standard lease terms (Figures 3-48 and 3-49, Category 9). Based on resource estimates, these lands contain 11 percent of the Federal oil (0.08 MMBbls) and 18 percent (0.07 TCF) of the Federal natural gas.
- Approximately 15 percent (0.10 million acres) of the Federal land is accessible with restrictions on oil and gas operations beyond standard lease terms (Figures 3-48 and 3-49, Categories 5 through 8). Based on resource estimates, these lands contain 32 percent of the Federal oil (0.24 MMBbls) and 35 percent (0.14 TCF) of the Federal natural gas.
- Approximately 82 percent (0.57 million acres) of the Federal land is not accessible (Figures 3-48 and 3-49, Categories 1 through 4). Based on resource estimates, these lands contain 57 percent of the Federal oil (0.43 MMBbls) and 47 percent (0.19 TCF) of the Federal natural gas.

Table 3-11. Black Warrior Basin Study Area—Federal Land and Oil and Natural Gas Resources by Access Category

Figure 3-48. Simplified Chart of Results, Black Warrior Basin Study Area—Federal Land and Oil and Natural Gas Resources by Accessibility

Figure 3-49. Chart of Results, Black Warrior Basin Study Area—Federal Land and

¹ Interior Reaches Agreement to Acquire Mineral Rights in Everglades, Settles Litigation on Offshore Oil and Gas Leases in Destin Dome.. See the website: <http://www.fws.gov/southeast/news/2002/n02-002.html>

Oil and Natural Gas Resources by Access Category

Figure 3-50. Federal Land Access Categorization Map, Black Warrior Basin Study Area

Figure 3-51. Map of Total Federal Oil, Black Warrior Basin Study Area

Figure 3-52. Map of Total Federal Natural Gas, Black Warrior Basin Study Area

3.1.11 Appalachian Basin

- Approximately 16 percent (0.9 million acres) of the Federal land is accessible under standard lease terms (Figures 3-53 and 3-54, Category 9). Based on resource estimates, these lands contain 15 percent (5 MMbbls) of the Federal oil and 17 percent (0.4 TCF) of the Federal natural gas.
- Approximately 39 percent (2.1 million acres) of the Federal land is accessible with restrictions on oil and gas operations beyond standard lease terms (Figures 3-53 and 3-54, Categories 5 through 8). Based on resource estimates, these lands contain 43 percent (14 MMbbls) of the Federal oil and 41 percent (1 TCF) of the Federal natural gas.
- Approximately 45 percent (2.4 million acres) of the Federal land is not accessible (Figures 3-53 and 3-54, Categories 1 through 4). Based on resource estimates, these lands contain about 41 percent (14 MMbbls) of the Federal oil and 42 percent (1.01 TCF) of the Federal natural gas.
- Most of the undiscovered gas resource (94 percent) is expected to occur in continuous deposits.
- Coalbed natural gas accounts for about 13 percent of the total undiscovered continuous gas.

Table 3-12. Appalachian Basin Study Area—Federal Land and Oil and Natural Gas Resources by Access Category

Figure 3-53. Simplified Chart of Results, Appalachian Basin Study Area—Federal Land and Oil and Natural Gas Resources by Accessibility

Figure 3-54. Chart of Results, Appalachian Basin Study Area—Federal Land and Oil and Natural Gas Resources by Access Category

Figure 3-55. Federal Land Access Categorization Map, Appalachian Basin Study Area

Figure 3-56. Map of Total Federal Oil, Appalachian Basin Study Area

Figure 3-57. Map of Total Federal Natural Gas, Appalachian Basin Study Area

3.2 REGIONAL FEATURES

Figure 3-58 shows a comparison of the access charts for the top five basins in the following categories: total Federal land, total Federal oil, and total Federal natural gas. The pie charts are scaled proportionately to one another. Northern Alaska dominates both the land and the resource categories, followed by the Rocky Mountain basins.

Figure 3-58. Charts of the Top Five Areas

Figure 3-59 is a map showing the Phase II study areas with the access category charts compiled by region, relatively sized, by total resources.² The largest amount of oil and gas resources are found in Northern Alaska (165 TCFe), followed closely by the Rocky Mountain region (142 TCFe), with the Eastern basins a distant third in rank (4 TCFe).

None of the resources in the two Northern Alaska study areas are accessible under standard lease terms, 45% are accessible with additional restrictions (in NPRA only, due primarily to drilling being restricted to the winter), and 55% are inaccessible.

About 20% of the resources in the seven Rocky Mountain study areas are accessible under standard lease terms, 66% are accessible with additional restrictions (primarily because of timing limitations and the impact of conditions of approval), and 14% are inaccessible.

About 13% of the resources in the three Eastern study areas are accessible under standard lease terms, 35% are accessible with additional restrictions, and 52% are inaccessible.

Figure 3-59. Regional Charts

² On a TCF-equivalent (TCFe) basis