

# 3. Crude Oil Statistics

The United States had 21,371 million barrels of crude oil proved reserves as of December 31, 2004. Crude oil proved reserves declined by 2 percent in 2004 owing mostly to a large 9 percent decrease in the Gulf of Mexico.

Boosted by reserves additions in Wyoming, Montana, North Dakota, and Texas, the crude oil proved reserves of the onshore lower 48 States increased by 0.1 percent. However, three of the four largest crude oil reserves areas, the Gulf of Mexico, Alaska, and California, registered reserves declines. U.S. new field discoveries were the lowest in 12 years and as a result operators only replaced 71 percent of crude oil production with reserves additions. (Figure 15).

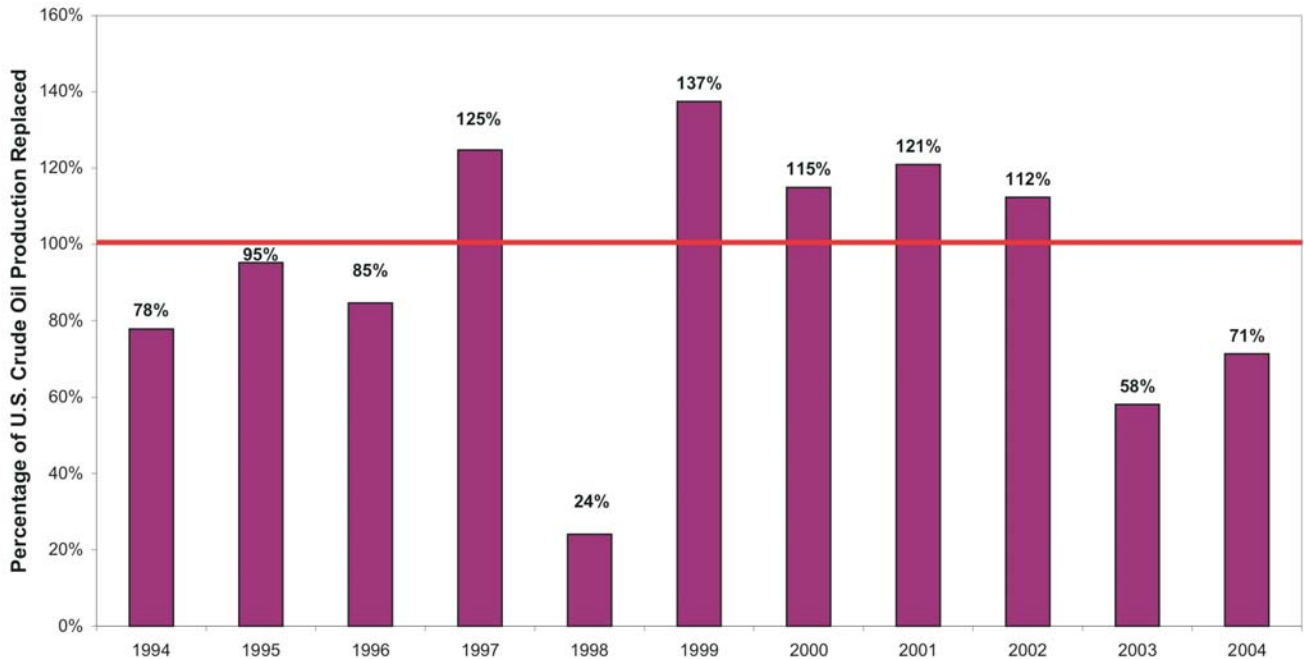
## Proved Reserves

Table 6 presents the U.S. proved reserves of crude oil as of December 31, 2004, by selected States and State subdivisions.

Figure 16 maps 2004 crude oil proved reserves by area. The following four areas account for 77 percent of U.S. crude oil proved reserves:

Area	Percent of U.S. Oil Reserves
Texas	22
Alaska	20
Gulf of Mexico Federal Offshore	19
California	16
<b>Area Total</b>	<b>77</b>

Figure 15. Replacement of U.S. Crude Oil Production by Reserves Additions, 1994-2004.



Source: Energy Information Administration, Office of Oil and Gas.

**Table 6. Crude Oil Proved Reserves, Reserves Changes, and Production, 2004**  
(Million Barrels of 42 U.S. Gallons)

State and Subdivision	Published Proved Reserves 12/31/03	Changes in Reserves During 2004									Proved Reserves 12/31/04
		Adjustments (+,-)	Revision Increases (+)	Revision Decreases (-)	Sales (-)	Acquisitions (+)	Extensions (+)	New Field Discoveries (+)	New Reservoir Discoveries in Old Fields (+)	Estimated Production (-)	
Alaska	4,446	-1	191	144	0	0	111	0	58	334	4,327
<b>Lower 48 States</b>	<b>17,445</b>	<b>75</b>	<b>1,748</b>	<b>1,375</b>	<b>937</b>	<b>960</b>	<b>506</b>	<b>33</b>	<b>74</b>	<b>1,485</b>	<b>17,044</b>
Alabama	52	2	0	4	0	0	8	0	0	5	53
Arkansas	50	1	4	1	0	0	1	2	0	6	51
California	3,452	3	210	97	142	147	42	0	0	239	3,376
Coastal Region Onshore	395	-5	16	23	11	17	8	0	0	17	380
Los Angeles Basin Onshore	319	4	7	50	0	0	22	0	0	16	286
San Joaquin Basin Onshore	2,565	4	154	20	114	115	10	0	0	191	2,523
State Offshore	173	0	33	4	17	15	2	0	0	15	187
Colorado	217	-1	16	4	10	13	12	0	0	18	225
Florida	68	1	0	1	0	0	0	0	0	3	65
Illinois	125	-7	11	2	25	0	0	0	0	10	92
Indiana	19	-6	2	0	2	0	0	0	0	2	11
Kansas	243	10	38	13	15	11	4	0	0	33	245
Kentucky	25	3	1	2	0	0	2	0	0	2	<sup>a</sup> 27
Louisiana	452	0	67	71	31	29	32	2	4	57	427
North	66	3	10	14	2	1	3	0	0	9	58
South Onshore	314	-3	42	43	21	21	25	2	3	36	304
State Offshore	72	0	15	14	8	7	4	0	1	12	65
Michigan	75	-12	2	9	0	0	2	0	0	5	53
Mississippi	169	-5	32	2	4	5	0	0	0	17	178
Montana	315	-5	54	32	5	10	47	0	2	22	364
Nebraska	16	1	1	1	0	1	0	0	0	3	15
New Mexico	677	11	60	48	76	72	32	0	1	60	669
East	668	13	58	47	76	72	32	0	1	59	662
West	9	-2	2	1	0	0	0	0	0	1	7
North Dakota	353	-4	167	115	27	32	14	0	1	32	389
Ohio	66	-16	6	3	0	0	1	0	0	5	49
Oklahoma	588	23	96	104	56	58	15	0	1	51	570
Pennsylvania	13	1	1	2	0	0	1	0	0	2	12
Texas	4,583	71	401	261	229	281	125	2	0	360	4,613
RRC District 1	59	-1	9	2	4	2	2	1	0	8	58
RRC District 2 Onshore	51	9	2	4	1	1	6	0	0	8	56
RRC District 3 Onshore	190	24	50	47	16	9	3	0	0	28	185
RRC District 4 Onshore	30	1	6	7	0	0	1	0	0	4	27
RRC District 5	20	0	7	1	0	1	0	0	0	4	23
RRC District 6	189	13	8	12	1	2	4	0	0	16	187
RRC District 7B	68	4	11	2	8	6	4	0	0	10	73
RRC District 7C	205	-3	9	10	8	9	20	0	0	16	206
RRC District 8	1,513	7	120	95	81	129	67	1	0	109	1,552
RRC District 8A	2,089	9	162	56	104	112	14	0	0	136	2,090
RRC District 9	114	4	10	15	3	4	3	0	0	15	102
RRC District 10	48	1	6	9	2	5	1	0	0	5	45
State Offshore	7	3	1	1	1	1	0	0	0	1	9
Utah	221	3	14	17	27	27	7	0	0	13	215
West Virginia	13	-4	3	0	0	0	0	0	0	1	11
Wyoming	517	4	110	23	54	56	61	0	0	43	628
Federal Offshore	5,120	3	450	562	234	218	99	27	65	495	4,691
Pacific (California)	566	1	24	14	103	97	4	0	0	28	547
Gulf of Mexico (Louisiana)	4,251	2	319	448	106	119	94	27	65	404	3,919
Gulf of Mexico (Texas)	303	0	107	100	25	2	1	0	0	63	225
Miscellaneous <sup>b</sup>	16	-2	2	1	0	0	1	0	0	1	15
<b>U.S. Total</b>	<b>21,891</b>	<b>74</b>	<b>1,939</b>	<b>1,519</b>	<b>937</b>	<b>960</b>	<b>617</b>	<b>33</b>	<b>132</b>	<b>1,819</b>	<b>21,371</b>

<sup>a</sup>Indicates the estimate is associated with a sampling error (95 percent confidence interval) that exceeds 20 percent of the estimated value.

<sup>b</sup>Includes Arizona, Missouri, Nevada, New York, South Dakota, Tennessee, and Virginia.

Note: The production estimates in this table are based on data reported on Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves." They may differ from the official Energy Information Administration production data for crude oil for 2004 contained in the *Petroleum Supply Annual 2004*, DOE/EIA-0340(04).

Source: Energy Information Administration, Office of Oil and Gas.

Figure 16. Crude Oil Proved Reserves by Area, 2004

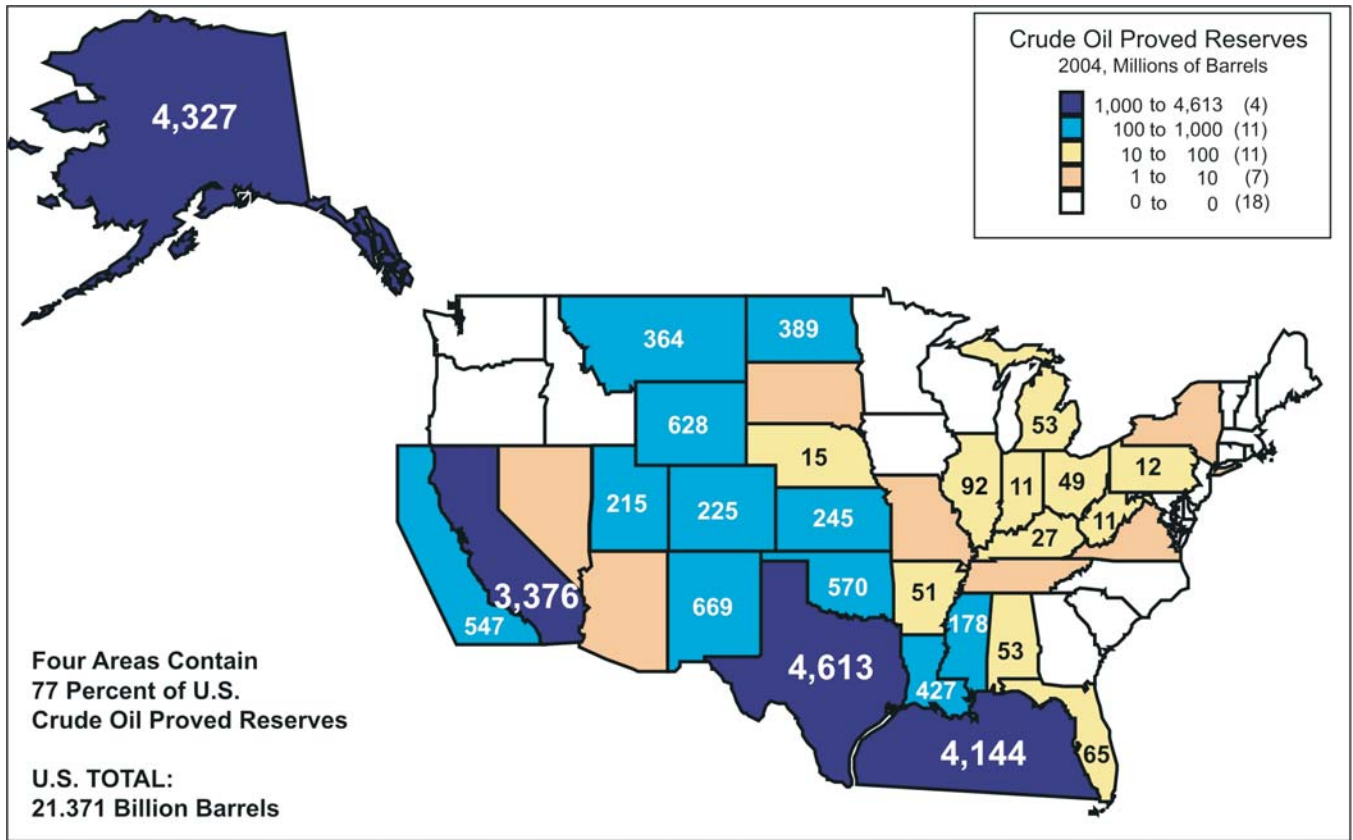
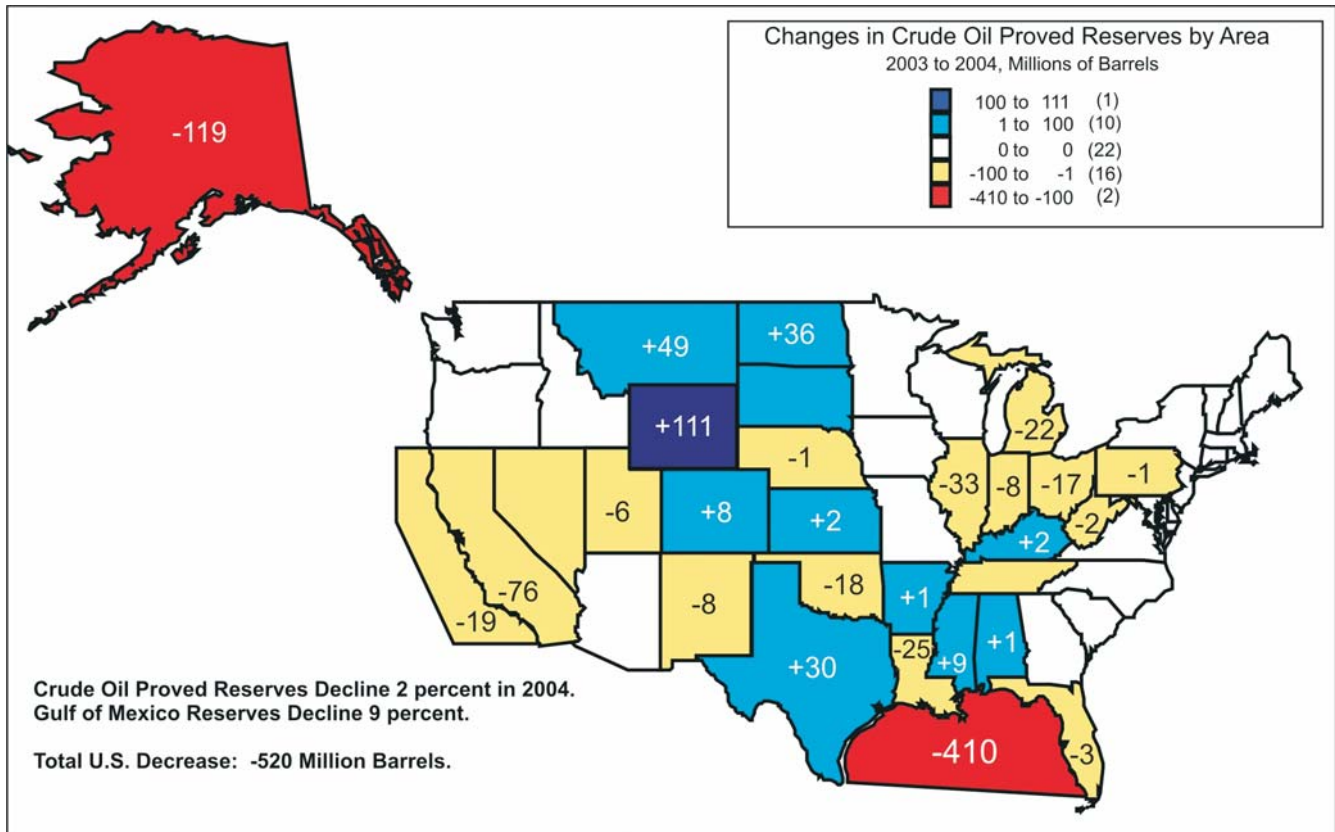


Figure 17. Changes in Crude Oil Proved Reserves by Area, 2003 to 2004



Source: Energy Information Administration, Office of Oil and Gas.

Of these four areas, only Texas had an increase in crude oil proved reserves in 2004 (less than 1 percent). The Gulf of Mexico reported a 9 percent decrease, Alaska declined 3 percent, and California declined 2 percent.

## Discussion of Reserves Changes

Figure 17 maps the change in crude oil proved reserves from 2003 to 2004 by area. Here's how the top four areas fared compared to the total United States:

Area	Change in U.S. Oil Reserves (million barrels)
Texas	+30
Alaska	-119
Gulf of Mexico Federal Offshore	-410
California	-76
<b>Area Total</b>	<b>-575</b>
<b>U.S. Total</b>	<b>-520</b>

Figure 2 in Chapter 2 shows the components of the changes in crude oil proved reserves for 2004 and the preceding 10 years.

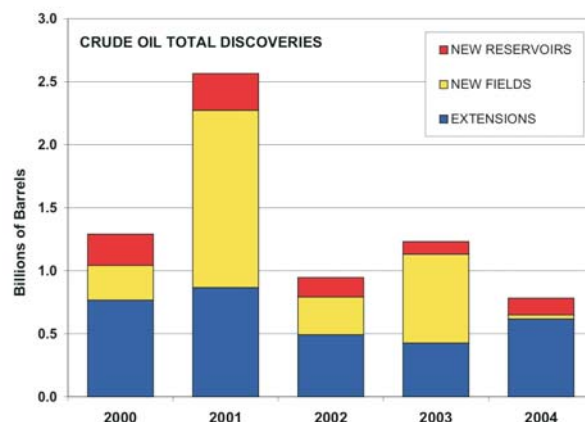
### Total Discoveries

Total discoveries are those new reserves attributable to extensions of existing fields, new field discoveries, and new reservoir discoveries in old fields. They result from the drilling of new wells.

Total discoveries of crude oil were 782 million barrels in 2004, 37 percent less than those of 2003. Only four areas had total discoveries exceeding 50 million barrels in 2004:

- The Gulf of Mexico Federal Offshore had 187 million barrels of total discoveries, 24 percent of the National total.
- Alaska had 169 million barrels of total discoveries, 22 percent of the National total.
- Texas had 127 million barrels of total discoveries, 16 percent of the National total.
- Wyoming had 61 million barrels of total discoveries, 8 percent of the National total.

The United States discovered an average of 1,105 million barrels of new crude oil proved reserves per year in the prior 10 years. Total discoveries in 2004 were 29 percent lower than that average.



### Extensions

Operators reported 617 million barrels of extensions in 2004, 45 percent more than in 2003. The highest volume of extensions was reported in Texas (125 million barrels). The second highest volume of extensions in 2004 was in Alaska with 111 million barrels. The Gulf of Mexico Federal Offshore reported 95 million barrels of extensions. Wyoming was fourth with 61 million barrels of extensions.

In the prior 10 years, U.S. operators reported an average of 422 million barrels of extensions per year. The 2004 extensions were 22 percent more than that average.

### New Field Discoveries

There were 33 million barrels of new field discoveries of crude oil reported in 2004. This is 95 percent less than in 2003 and the lowest volume reported in twelve years. Only four areas in the United States reported any new field discoveries. The Gulf of Mexico Federal Offshore had 27 million barrels (82 percent), and Arkansas, Louisiana, and Texas each had 2 million barrels of new field discoveries.

In the prior 10 years, U.S. operators had reported an annual average of 422 million barrels of reserves from new field discoveries. Reserves from new field discoveries in 2004 were 92 percent less than that average.

### New Reservoir Discoveries in Old Fields

Operators reported 132 million barrels of crude oil reserves from new reservoir discoveries in old fields in 2004. This is 31 percent more than 2003 and most of the

new reservoir discoveries in old fields came from two areas: the Gulf of Mexico Federal Offshore—65 million barrels (49 percent) and Alaska --58 million barrels (44 percent). The remaining 9 million barrels (7 percent) of new reservoirs were discovered in Louisiana, Montana, New Mexico, North Dakota, and Oklahoma.

In the prior 10 years, U.S. operators reported an annual average of 178 million barrels of reserves from new reservoir discoveries in old fields. Reserves from new reservoir discoveries in old fields in 2004 were 26 percent less than that average.

## Revisions and Adjustments

Thousands of positive and negative revisions to proved reserves occur each year as development wells are drilled, well performance is analyzed, new technology is applied, or economic conditions change. Adjustments are the annual changes in the published reserve estimates that cannot be directly attributed to the estimates for other reserve change categories because of the survey and statistical estimation methods employed.

There were 1,939 million barrels of revision increases, 1,519 million barrels of revision decreases, and 74 million barrels of adjustments in 2004. Combined, there were 494 million barrels of net revisions and adjustments for crude oil in 2004.

In the prior 10 years, net revisions and adjustments added an annual average of 865 million barrels. The 2004 net revisions and adjustments were 43 percent less than that average.

## Sales and Acquisitions

Sales represents that volume of crude oil proved reserves deducted from an operator's total reserves by selling or transferring operations of existing oil fields or properties to another operator (not a volume of production "sold" at the wellhead). Similarly, acquisitions are that volume of proved reserves added to an operator's total reserves through purchase or operations transfer of an existing oil field or properties.

There are several reasons why sales and acquisitions volumes are not equal. Since operators have different engineering staffs and resources, or different development plans or schedules, the estimate of proved reserves for a field can change with a change in operatorship. Timing of the transfer of operations can also impact these values.

In 2004, there were 937 million barrels of sales transactions between operators and 960 million barrels of acquisitions yielding a net difference of +23 million barrels.

## Production

U.S. production of crude oil in 2004 was an estimated 1,819 million barrels. This volume does not include lease condensate. This was less than 3 percent lower than 2003's production of 1,877 million barrels.

In the last quarter of 2004, Hurricane Ivan disrupted production operations in the Gulf of Mexico by damaging surface facilities and triggering underwater mudslides that destroyed sections of sea-bottom pipelines. Production from the Gulf of Mexico Federal Offshore dropped 4 percent from 2003 to 2004. Despite this, the Gulf remained the largest producing area in the United States with 26 percent of the National total (467 million barrels of production). Texas and Alaska were second and third, with 20 and 18 percent of the National production total, respectively. California was fourth with 13 percent.

The 2004 Form EIA-23 National production estimates (2,001 million barrels of crude oil and lease condensate) are 1 percent higher than the comparable Petroleum Supply Annual (PSA) 2004 volumes for crude oil and lease condensate production combined (1,983 million barrels).

## Areas of Note: Large Discoveries and Reserves Additions

The following State and area discussions summarize notable activities during 2004 concerning expected new field reserves, development plans, and possible production rates as reported in various trade publications. The citations do not necessarily reflect EIA's concurrence, but are considered important enough to be brought to the reader's attention.

The following areas were the major success stories for crude oil reserves and production for 2004.

### Wyoming

Wyoming led the Nation in net crude oil proved reserves additions in 2004, adding 111 million barrels to the National total.

- **Salt Creek Field:** Of particular note are the new carbon dioxide (CO<sub>2</sub>) injection enhanced oil recovery projects begun by Anadarko Petroleum Corporation, which completed construction of a pipeline to deliver CO<sub>2</sub> to Salt Creek, Monell, and Sussex fields in Wyoming in early 2004. Anadarko reports that the fields' production responses have met expectations." {39}

## Montana

Montana reported a net increase of 49 million barrels of crude oil proved reserves in 2004. Montana's production also increased by 16 percent to 22 million barrels in 2004.

- **Cedar Creek Anticline:** Burlington Resources is conducting two of the world's largest horizontally drilled waterflooding programs on the eastern flank of the Cedar Creek Anticline, centered in the 50-year old East Lookout Butte and Cedar Hills South fields. Burlington implemented a waterflood and 320-acre well spacing, and also extended the original horizontal wells to lateral lengths of 8,000 feet or more to improve waterflood response. These efforts have boosted the [estimated ultimate recovery] from the original 2 percent to 30 percent of the oil in place. Production has responded substantially, more than doubling in 2004. Capital investments in 2004 of \$113 million included drilling 47 new producing wells and eight injection wells.{40}

## North Dakota

North Dakota reported a net increase of 36 million barrels of proved oil reserves in 2004. Like Montana, this State is a beneficiary of increased activity at the Cedar Creek Anticline, which straddles the border of both States. (See **Cedar Creek Anticline** bullet, above.) North Dakota's oil production rose 6 percent in 2004.

## Texas

Texas reported a net increase of 30 million barrels of proved oil reserves in 2004 and had the largest volume of extensions in 2004 (125 million barrels). The majority of these extensions were to fields located in the Permian Basin.

## Other Gain Areas

**Mississippi:** Mississippi reported a net increase of 9 million barrels of crude oil proved reserves in 2004.

**Colorado:** Colorado reported a net increase of 8 million barrels of crude oil proved reserves in 2004.

## Areas of Note: Large Reserves Declines

The following areas had large declines in crude oil proved reserves due to downward revisions or unreplaced production.

### Gulf of Mexico Federal Offshore

The Gulf of Mexico Federal Offshore crude oil proved reserves declined 9 percent (-410 million barrels) in 2004. Operators also reported a production decrease of 4 percent (-18 million barrels) from the 2003 level. Hurricane Ivan's damage was a factor, as mentioned previously. In its aftermath, U.S. Secretary of Energy Spencer Abraham agreed to loan out 1.7 million barrels of oil from the Strategic Petroleum Reserve.

### Alaska

Alaskan crude oil proved reserves declined 3 percent (-119 million barrels) in 2004. No new field discoveries were reported in Alaska in 2004 and Alaska's proved reserves additions did not offset its oil production. Alaska's estimated 2004 production of 334 million barrels decreased 6 percent (-23 million barrels) from the 2003 level.

### California

There was a net decline of 2 percent (-76 million barrels) in California's crude oil proved reserves in 2004. California's crude oil production declined 3 percent (-7 million barrels) from its 2003 level.

### Other Decline Areas

Discovery and development of new or existing oil fields was also outpaced by crude oil production in the following areas of the United States:

**Illinois:** Proved oil reserves decreased by 26 percent (-33 million barrels). A large volume of reported sales was not reported by any operator as an acquisition in 2004.

**Louisiana:** Proved oil reserves decreased by 6 percent (-25 million barrels).

Nonproducing reserves are those awaiting well workovers, the drilling of extensions or additional development wells, installation of production or pipeline facilities, and depletion of other zones or reservoirs before recompletion in reservoirs not currently open to production.

## Reserves in Nonproducing Status

Not all proved reserves of crude oil reported in 2004 were producing. Operators reported 5,143 million barrels of proved reserves in nonproducing status, 8 percent less than reported in 2003 (5,580 million barrels). Nonproducing crude oil reserves (not including lease condensate) are listed in **Table 7**.

**Table 7. Reported Reserves in Nonproducing Status for Crude Oil, 2004<sup>a</sup>**  
(Million Barrels of 42 U.S. Gallons)

State and Subdivision	Nonproducing Crude Oil Reserves	State and Subdivision	Nonproducing Crude Oil Reserves
Alaska . . . . .	707	North Dakota . . . . .	52
Lower 48 States . . . . .	4,436	Ohio . . . . .	7
Alabama . . . . .	2	Oklahoma . . . . .	92
Arkansas . . . . .	3	Pennsylvania . . . . .	1
California . . . . .	267	Texas . . . . .	625
Coastal Region Onshore . . . . .	16	RRC District 1 . . . . .	9
Los Angeles Basin Onshore . . . . .	63	RRC District 2 Onshore . . . . .	13
San Joaquin Basin Onshore . . . . .	158	RRC District 3 Onshore . . . . .	21
State Offshore . . . . .	30	RRC District 4 Onshore . . . . .	4
Colorado . . . . .	62	RRC District 5 . . . . .	1
Florida . . . . .	6	RRC District 6 . . . . .	15
Illinois . . . . .	0	RRC District 7B . . . . .	5
Indiana . . . . .	0	RRC District 7C . . . . .	14
Kansas . . . . .	11	RRC District 8 . . . . .	218
Kentucky . . . . .	5	RRC District 8A . . . . .	311
Louisiana . . . . .	150	RRC District 9 . . . . .	9
North . . . . .	11	RRC District 10 . . . . .	5
South Onshore . . . . .	115	State Offshore . . . . .	0
State Offshore . . . . .	24	Utah . . . . .	61
Michigan . . . . .	10	Virginia . . . . .	0
Mississippi . . . . .	79	West Virginia . . . . .	0
Montana . . . . .	104	Wyoming . . . . .	45
Nebraska . . . . .	0	Federal Offshore . . . . .	2,708
New Mexico . . . . .	142	Pacific (California) . . . . .	55
East . . . . .	142	Gulf of Mexico (Louisiana) . . . . .	2,581
West . . . . .	0	Gulf of Mexico (Texas) . . . . .	72
New York . . . . .	0	Miscellaneous <sup>b</sup> . . . . .	4
		<b>U.S. Total . . . . .</b>	<b>5,143</b>

<sup>a</sup>Includes only those operators who produced 400,000 barrels of crude oil or 2 billion cubic feet of natural gas, or both, during the report year (Category I or Category II operators).

<sup>b</sup>Includes Arizona, Missouri, Nevada, South Dakota, and Tennessee.

Source: Form EIA-23, "Annual Survey of Domestic Oil and Gas Reserves," 2004.

[eia.doe.gov](http://eia.doe.gov)



Energy Information Administration