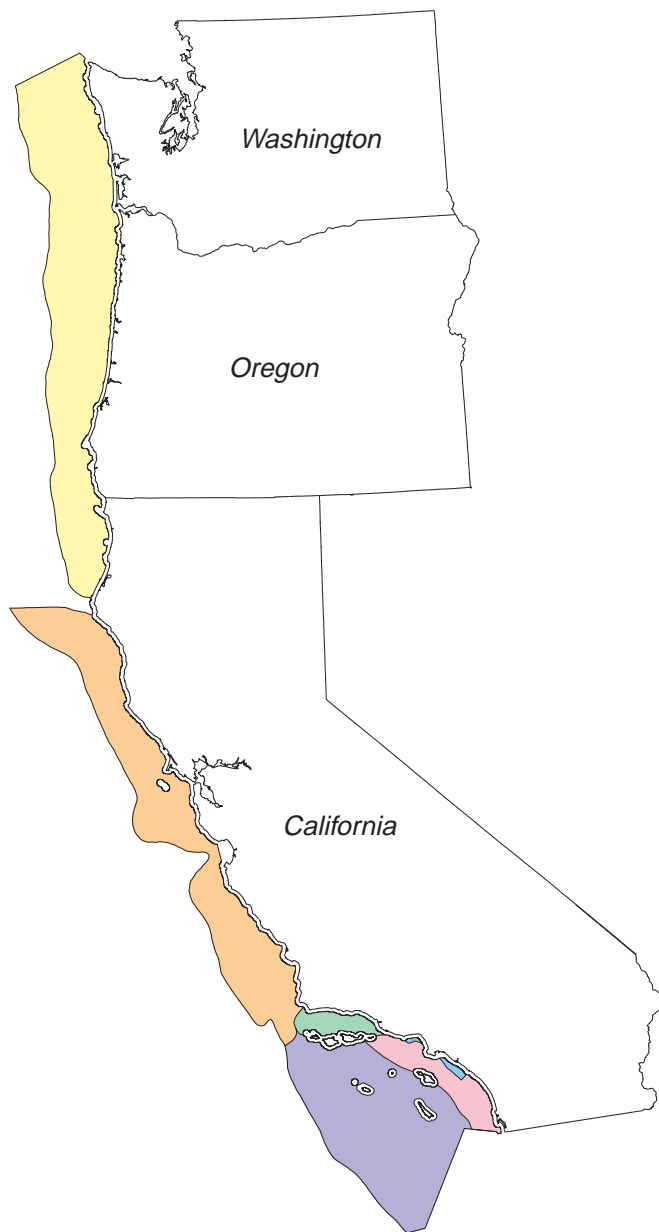


Oil and Gas Resources in the Pacific Outer Continental Shelf as of January 1, 1999

An Expanded Update to the 1995 National Assessment of United States Oil and Gas Resources



Front Cover. *Map of the Pacific OCS Region showing provinces defined for the 1995 National Assessment. Provinces are indicated by color as follows:*

<i>Pacific Northwest Province</i>	<i>yellow</i>
<i>Central California Province</i>	<i>orange</i>
<i>Santa Barbara-Ventura Basin Province</i>	<i>green</i>
<i>Los Angeles Basin Province</i>	<i>blue</i>
<i>Inner Borderland Province</i>	<i>pink</i>
<i>Outer Borderland Province</i>	<i>purple</i>

Oil and Gas Resources in the Pacific Outer Continental Shelf as of January 1, 1999

An Expanded Update to the 1995 National Assessment of United States Oil and Gas Resources

By

Catherine A. Dunkel

CONTENTS

INTRODUCTION 1

DISCOVERED RESOURCES 1

- Volume
- Geographic Distribution
- Cumulative Production versus Remaining Reserves
- Proved versus Unproved Remaining Reserves

UNDISCOVERED RESOURCES 8

- Undiscovered Conventionally Recoverable Resources
 - Volume
 - Geographic Distribution
- Undiscovered Economically Recoverable Resources
 - Volume
 - Geographic Distribution

TOTAL RESOURCE ENDOWMENT 13

- Volume
- Geographic Distribution
- Discovered versus Undiscovered Resources

REFERENCES 13

FIGURES

1. Map of the Pacific OCS Region showing assessment provinces, geologic basins and areas, and assessed areas 2

Discovered Resources

2. Map of discovered fields in the Pacific OCS Region 3
3. Distribution of discovered oil resources in the Pacific OCS Region, by assessment area 6
4. Distribution of discovered gas resources in the Pacific OCS Region, by assessment area 7

Undiscovered Resources

5. Distribution of undiscovered conventionally recoverable and economically recoverable oil resources in the Pacific OCS Region, by assessment area 10
6. Distribution of undiscovered conventionally recoverable and economically recoverable gas resources in the Pacific OCS Region, by assessment area 11

Total Resource Endowment

7. Distribution of the total endowment of oil resources in the Pacific OCS Region, by assessment area 15
8. Distribution of the total endowment of gas resources in the Pacific OCS Region, by assessment area 16

TABLES

Discovered Resources

1. Estimates of discovered oil and gas resources in the Pacific OCS Region, by assessment area 4
2. Estimates of remaining oil and gas reserves in the Pacific OCS Region, by assessment area 5

Undiscovered Resources

3. Estimates of undiscovered conventionally recoverable oil and gas resources in the Pacific OCS Region, by assessment area 9
4. Estimates of undiscovered economically recoverable oil and gas resources in the Pacific OCS Region for four economic scenarios, by assessment area 12

Total Resource Endowment

5. Estimates of the total endowment of oil and gas resources in the Pacific OCS Region, by assessment area 14

INTRODUCTION

This paper presents a summary of estimates of oil and gas resources in the Pacific Outer Continental Shelf (OCS) Region of the United States (i.e., the Federal offshore areas of Washington, Oregon, and

California¹) as of January 1, 1999. Estimates are presented for discovered resources, undiscovered resources, and total resource endowment, and the geographic distribution of the resources is discussed.

DISCOVERED RESOURCES

The estimates of discovered oil and gas resources presented here are based on the most recent annual review and reevaluation of fields where oil and gas have been discovered and reflect resource volumes as of January 1, 1999. A detailed discussion of these discovered resources (including definitions of terms used here) is provided in OCS Report MMS 2000-063 (Sorensen and others, 2000).

Volume

The total volume of discovered oil and gas resources (original recoverable reserves) in the Region is estimated to be 2.64 billion barrels (Bbbl) and 3.08 trillion cubic feet (Tcf). This volume includes 915 million barrels (MMbbl) and 873 billion cubic feet (Bcf) of cumulative production and 1.72 Bbbl and 2.21 Tcf of remaining reserves. The remaining reserves include 408 MMbbl and 1.29 Tcf of proved reserves and 1.32 Bbbl and 922 Bcf of unproved reserves.

Geographic Distribution

The discovered oil and gas resources of the Region are estimated to exist within 38 fields in three assessment areas, including 14 fields in the Santa Maria-Partington basin, 22 fields in the Santa Barbara-Ventura basin, and 2 fields in the Los Angeles basin (figs. 1 and 2). The estimates of the resources in each assessment area are listed in tables 1 and 2. The distribution of the resources among the assessment areas is illustrated in figures 3 and 4.

The majority of the discovered combined oil-equivalent resources of the Region are estimated to be oil. Relatively large volumes of discovered oil resources (greater than 1 Bbbl) are estimated to exist in the Santa Maria-Partington basin (1.43 Bbbl) and Santa Barbara-Ventura basin (1.10 Bbbl). A large volume of discovered gas resources (greater than 1 Tcf) is estimated to exist in the Santa Barbara-Ventura basin (2.18 Tcf).

¹ The assessment areas and provinces cited in this paper are identical to those used for the 1995 National Assessment of United States Oil and Gas Resources. The assessment areas in the Inner Borderland province include a small area in the State offshore and/or onshore area adjacent to the Federal offshore area.

Cumulative Production versus Remaining Reserves

Approximately one third of the discovered oil and gas resources in the Region has been produced (figs. 3B and 4B) from 12 fields, including 3 fields in the Santa Maria-Partington basin, 8 fields in the Santa Barbara-Ventura basin, and 1 field in the Los Angeles basin. The majority of oil and gas resources has been produced from the Santa Barbara-Ventura basin and Santa Maria-Partington basin and the majority of remaining oil and gas reserves also exist in these areas; however, the relative proportion of cumulative production and remaining reserves varies by area.

In the Santa Maria-Partington basin, the majority of the discovered oil and gas resources have not been produced (figs. 3C and 4C). In the Santa Barbara-Ventura basin, more than half of the discovered oil resources and less than half of the discovered gas resources have been produced (figs. 3D and 4D). In the Los Angeles basin, nearly three quarters of the discovered oil and gas resources have been produced (figs. 3E and 4E).

Proved versus Unproved Remaining Reserves

Approximately one quarter of the remaining oil reserves and more than one half of the remaining gas reserves in the Region are proved reserves; however, the relative proportion of proved and unproved remaining reserves varies by area. In the Santa Maria-Partington basin, the majority of the remaining oil and gas reserves are unproved. In the Santa Barbara-Ventura basin and Los Angeles basin, the majority of remaining oil and gas reserves are proved.

Proved remaining reserves are attributed to 13 fields (12 of which are producing), including 3 fields in the Santa Maria-Partington basin, 9 fields in the Santa Barbara-Ventura basin, and 1 field in the Los Angeles basin. Unproved remaining reserves are attributed to 25 fields (all of which are non-producing), including 11 fields in the Santa Maria-Partington basin, 13 fields in the Santa Barbara-Ventura basin, and 1 field in the Los Angeles basin.

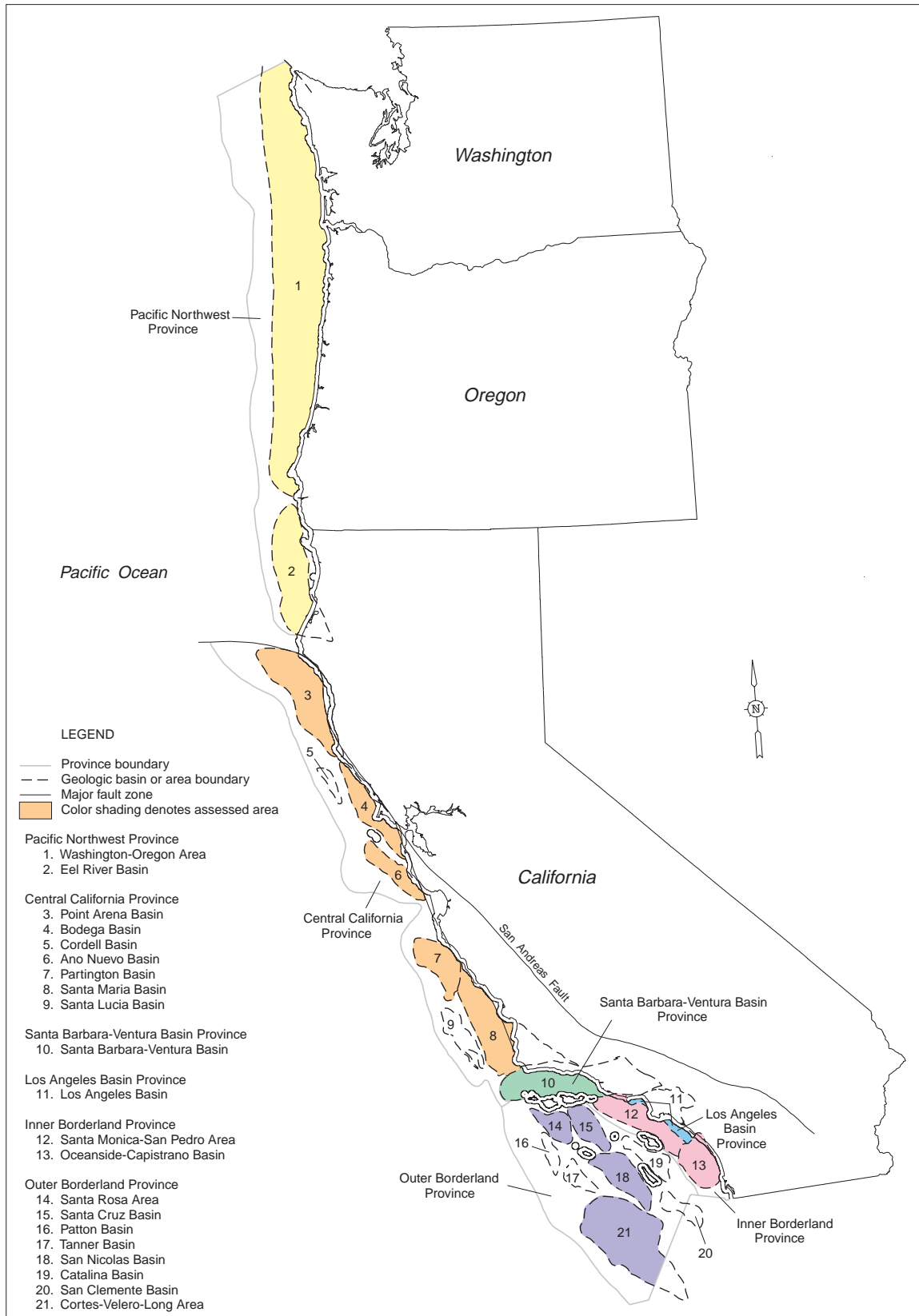


Figure 1. Map of the Pacific OCS Region showing assessment provinces, geologic basins and areas, and areas assessed for the 1995 National Assessment of United States Oil and Gas Resources. Colors correspond to the provinces listed in the tables and shown in other figures.

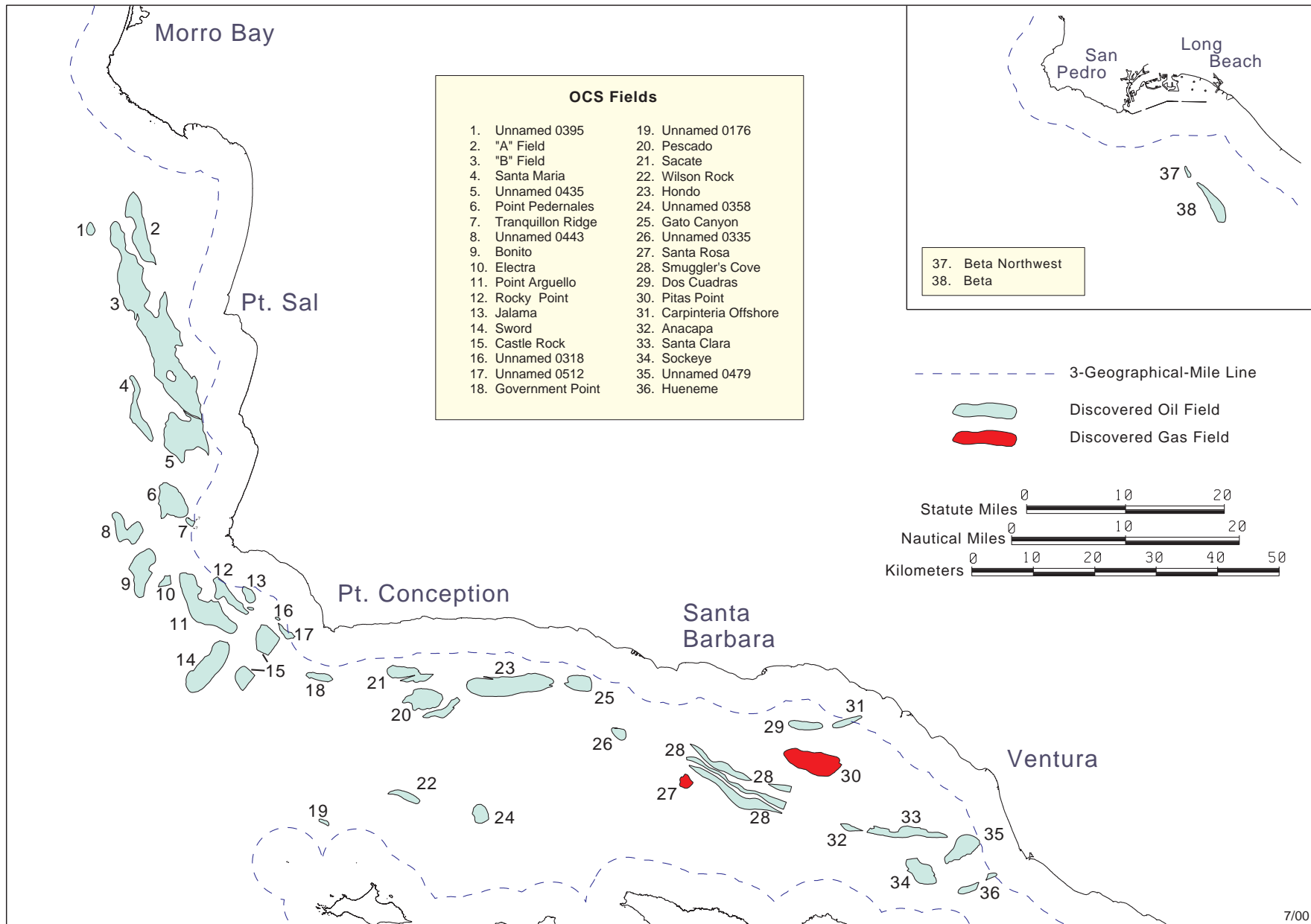


Figure 2. Map of discovered fields in the Pacific OCS Region (all offshore southern California). Dashed line denotes 3-geographical-mile boundary between State and Federal waters.

Table 1. Estimates of discovered oil and gas resources in the Pacific OCS Region as of January 1, 1999, by assessment area. Some total values may not equal the sum of the component values due to independent rounding.

Assessment Area	Cumulative Production			Remaining Reserves			Original Recoverable Reserves		
	Oil (Bbbl)	Gas (Tcf)	BOE (Bbbl)	Oil (Bbbl)	Gas (Tcf)	BOE (Bbbl)	Oil (Bbbl)	Gas (Tcf)	BOE (Bbbl)
Pacific Northwest Province									
Washington-Oregon Area	0	0	0	0	0	0	0	0	0
Eel River Basin	0	0	0	0	0	0	0	0	0
<i>Total Province</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Central California Province									
Point Arena Basin	0	0	0	0	0	0	0	0	0
Bodega Basin	0	0	0	0	0	0	0	0	0
Año Nuevo Basin	0	0	0	0	0	0	0	0	0
Santa Maria-Partington Basin	0.19	0.08	0.21	1.24	0.78	1.38	1.43	0.87	1.58
<i>Total Province</i>	<i>0.19</i>	<i>0.08</i>	<i>0.21</i>	<i>1.24</i>	<i>0.78</i>	<i>1.38</i>	<i>1.43</i>	<i>0.87</i>	<i>1.58</i>
Santa Barbara-Ventura Basin Province									
Santa Barbara-Ventura Basin	0.65	0.77	0.78	0.45	1.42	0.71	1.10	2.18	1.49
<i>Total Province</i>	<i>0.65</i>	<i>0.77</i>	<i>0.78</i>	<i>0.45</i>	<i>1.42</i>	<i>0.71</i>	<i>1.10</i>	<i>2.18</i>	<i>1.49</i>
Los Angeles Basin Province									
Los Angeles Basin	0.08	0.03	0.08	0.03	<0.01	0.03	0.11	0.03	0.12
<i>Total Province</i>	<i>0.08</i>	<i>0.03</i>	<i>0.08</i>	<i>0.03</i>	<i><0.01</i>	<i>0.03</i>	<i>0.11</i>	<i>0.03</i>	<i>0.12</i>
Inner Borderland Province									
Santa Monica-San Pedro Area	0	0	0	0	0	0	0	0	0
Oceanside-Capistrano Basin ¹	<0.01	<0.01	<0.01	negligible			<0.01	<0.01	<0.01
<i>Total Province¹</i>	<i><0.01</i>	<i><0.01</i>	<i><0.01</i>	<i>negligible</i>			<i><0.01</i>	<i><0.01</i>	<i><0.01</i>
Outer Borderland Province									
Santa Cruz-Santa Rosa Area	0	0	0	0	0	0	0	0	0
San Nicolas Basin	0	0	0	0	0	0	0	0	0
Cortes-Velero-Long Area	0	0	0	0	0	0	0	0	0
<i>Total Province</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
<i>Total Pacific OCS Region¹</i>	<i>0.92</i>	<i>0.87</i>	<i>1.07</i>	<i>1.72</i>	<i>2.21</i>	<i>2.12</i>	<i>2.64</i>	<i>3.08</i>	<i>3.19</i>

¹ Includes a small area and volume of resources in the State offshore and/or onshore area adjacent to the Federal offshore area.

Table 2. Estimates of remaining oil and gas reserves in the Pacific OCS Region as of January 1, 1999, by assessment area. Some total values may not equal the sum of the component values due to independent rounding.

Assessment Area	Proved Remaining Reserves			Unproved Remaining Reserves			Total Remaining Reserves		
	Oil (Bbbl)	Gas (Tcf)	BOE (Bbbl)	Oil (Bbbl)	Gas (Tcf)	BOE (Bbbl)	Oil (Bbbl)	Gas (Tcf)	BOE (Bbbl)
Pacific Northwest Province									
Washington-Oregon Area	0	0	0	0	0	0	0	0	0
Eel River Basin	0	0	0	0	0	0	0	0	0
<i>Total Province</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Central California Province									
Point Arena Basin	0	0	0	0	0	0	0	0	0
Bodega Basin	0	0	0	0	0	0	0	0	0
Año Nuevo Basin	0	0	0	0	0	0	0	0	0
Santa Maria-Partington Basin	0.11	0.10	0.13	1.13	0.69	1.25	1.24	0.78	1.38
<i>Total Province</i>	<i>0.11</i>	<i>0.10</i>	<i>0.13</i>	<i>1.13</i>	<i>0.69</i>	<i>1.25</i>	<i>1.24</i>	<i>0.78</i>	<i>1.38</i>
Santa Barbara-Ventura Basin Province									
Santa Barbara-Ventura Basin	0.27	1.18	0.48	0.18	0.24	0.23	0.45	1.42	0.71
<i>Total Province</i>	<i>0.27</i>	<i>1.18</i>	<i>0.48</i>	<i>0.18</i>	<i>0.24</i>	<i>0.23</i>	<i>0.45</i>	<i>1.42</i>	<i>0.71</i>
Los Angeles Basin Province									
Los Angeles Basin	0.03	<0.01	0.03	<0.01	<0.01	<0.01	0.03	<0.01	0.03
<i>Total Province</i>	<i>0.03</i>	<i><0.01</i>	<i>0.03</i>	<i><0.01</i>	<i><0.01</i>	<i><0.01</i>	<i>0.03</i>	<i><0.01</i>	<i>0.03</i>
Inner Borderland Province									
Santa Monica-San Pedro Area	0	0	0	0	0	0	0	0	0
Oceanside-Capistrano Basin ¹	negligible			negligible			negligible		
<i>Total Province¹</i>	<i>negligible</i>			<i>negligible</i>			<i>negligible</i>		
Outer Borderland Province									
Santa Cruz-Santa Rosa Area	0	0	0	0	0	0	0	0	0
San Nicolas Basin	0	0	0	0	0	0	0	0	0
Cortes-Velero-Long Area	0	0	0	0	0	0	0	0	0
<i>Total Province</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
<i>Total Pacific OCS Region¹</i>	<i>0.41</i>	<i>1.29</i>	<i>0.64</i>	<i>1.32</i>	<i>0.92</i>	<i>1.48</i>	<i>1.72</i>	<i>2.21</i>	<i>2.12</i>

¹ Includes a small area and volume of resources in the State offshore and/or onshore area adjacent to the Federal offshore area.

A

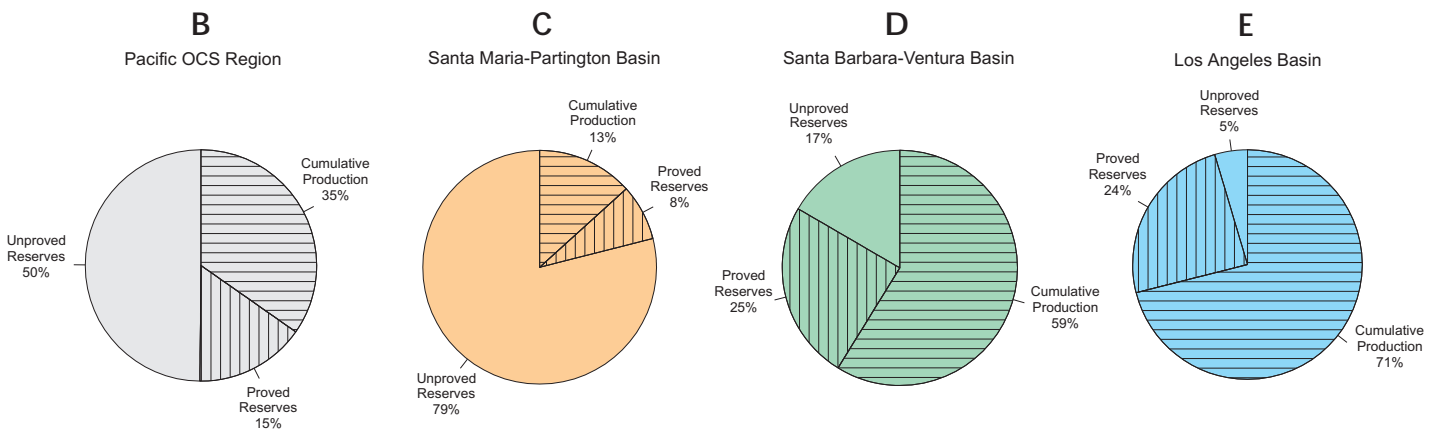
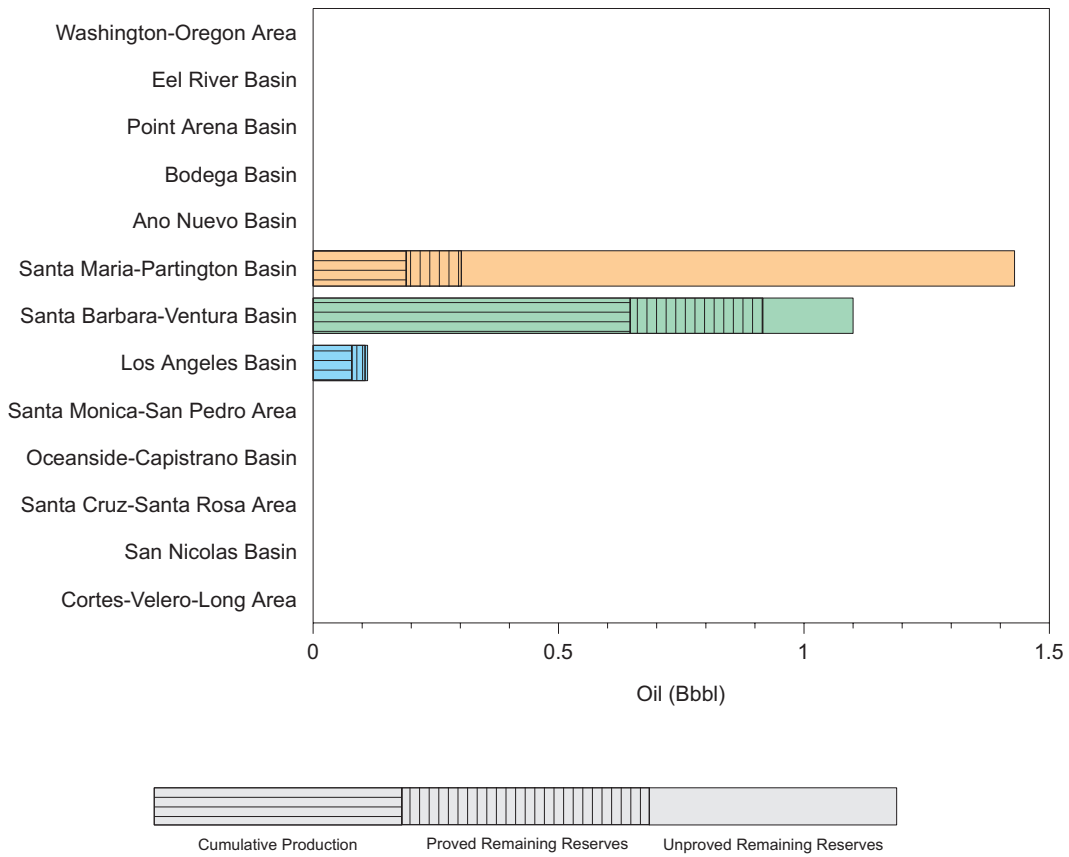


Figure 3. Distribution of the discovered oil resources in the Pacific OCS Region, by assessment area based on estimates listed in [tables 1](#) and [2](#). Bar chart (A) shows incremental volumes of discovered oil resources (including cumulative production, proved remaining reserves, and unproved remaining reserves); the entire bar represents the estimated total volume of discovered oil resources. Pie charts show proportionate volumes of cumulative production and remaining reserves in the Pacific OCS Region (B), Santa Maria-Partington Basin assessment area (C), Santa Barbara-Ventura Basin assessment area (D), and Los Angeles Basin assessment area (E). The sum of the percentage values in some pie charts may not equal 100 percent due to independent rounding.

A

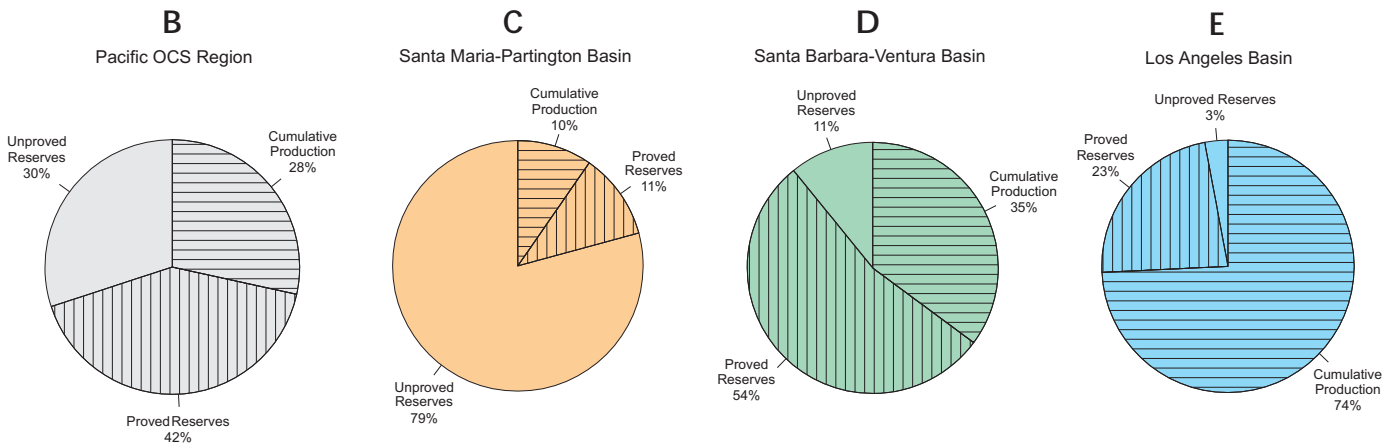
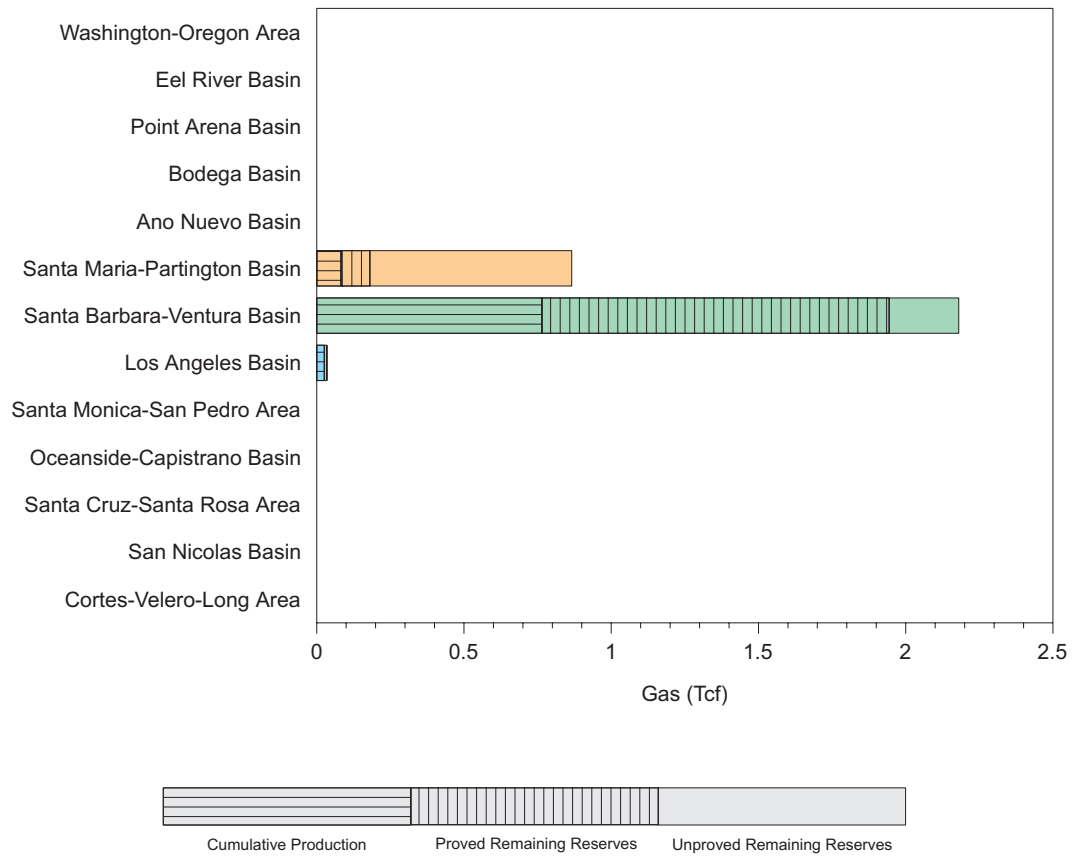


Figure 4. Distribution of the discovered gas resources in the Pacific OCS Region, by assessment area based on estimates listed in tables 1 and 2. Bar chart (A) shows incremental volumes of discovered gas resources (including cumulative production, proved remaining reserves, and unproved remaining reserves); the entire bar represents the estimated total volume of discovered gas resources. Pie charts show proportionate volumes of cumulative oil production and remaining oil reserves in the Pacific OCS Region (B), Santa Maria-Partington Basin assessment area (C), Santa Barbara-Ventura Basin assessment area (D), and Los Angeles Basin assessment area (E). The sum of the percentage values in some pie charts may not equal 100 percent due to independent rounding.

UNDISCOVERED RESOURCES

The estimates of undiscovered resources presented here are based on the results of the 1995 National Assessment of United States Oil and Gas Resources, which reflects resource volumes as of January 1, 1995. No significant additional data or information regarding undiscovered resources have been acquired and no new discoveries have been made since the 1995 assessment; therefore, the estimates of undiscovered resources are still valid and are considered to reflect resource volumes as of January 1, 1999. A detailed discussion of these undiscovered resources (including definitions of terms used here) is provided in OCS Report MMS 97-0019 (Dunkel and Piper, 1997).

UNDISCOVERED CONVENTIONALLY RECOVERABLE RESOURCES

Volume

The total volume of undiscovered conventionally recoverable oil resources in the Region is estimated to range from 8.99 to 12.62 Bbbl (low to high estimates) with a mean estimate of 10.71 Bbbl. The total volume of undiscovered conventionally recoverable gas resources in the Region is estimated to range from 15.21 to 23.19 Tcf with a mean estimate of 18.94 Tcf.

Geographic Distribution

The undiscovered conventionally recoverable oil and gas resources of the Region are estimated to exist within 46 assessed plays in 13 assessment areas (fig. 1). The low, mean, and high estimates of the resources in each assessment area are listed in table 3. The distribution of the resources among the assessment areas is illustrated, on the basis of mean estimates, in figures 5 and 6.

Approximately three quarters of the undiscovered conventionally recoverable combined oil-equivalent resources of the Region (on the basis of mean estimates) are estimated to be oil. Relatively large volumes of oil resources (greater than 1 Bbbl) are estimated to exist in the Point Arena basin (2.03 Bbbl), Santa Barbara-Ventura basin (1.85 Bbbl), Bodega basin (1.42 Bbbl), and Oceanside-Capistrano basin (1.11 Bbbl).

Approximately one quarter of the undiscovered conventionally recoverable combined oil-equivalent resources of the Region (on the basis of mean estimates) is estimated to be gas. Relatively large volumes of gas resources (greater than 1 Tcf) are estimated to exist in the Santa Barbara-Ventura basin (4.61 Tcf), Washington-Oregon area (2.30 Tcf),

Point Arena basin (2.14 Tcf), Eel River basin (1.61 Tcf), Bodega basin (1.57 Tcf), Oceanside-Capistrano basin (1.30 Tcf), and Cortes-Velero-Long area (1.10 Tcf).

UNDISCOVERED ECONOMICALLY RECOVERABLE RESOURCES

Volume

The total volume of undiscovered conventionally recoverable resources in the Region that is estimated to be economically recoverable at economic and technological conditions existing as of the 1995 assessment (i.e., the \$18-per-barrel economic scenario, which assumes prices of \$18 per bbl of oil and \$2.11 per Mcf of gas) is 5.31 Bbbl of oil and 8.30 Tcf of gas (mean estimates). Larger volumes of resources are estimated to be economically recoverable at more favorable economic conditions.

Geographic Distribution

The undiscovered economically recoverable oil and gas resources of the Region are estimated to exist within 13 assessment areas (fig. 1). Mean estimates of the resources in each assessment area are listed, for three economic scenarios, in table 4. The distribution of undiscovered economically recoverable oil and gas resources among the assessment areas is illustrated in figures 5 and 6.

One half of the undiscovered conventionally recoverable oil resources of the Region (on the basis of mean estimates and the \$18-per-barrel economic scenario) is estimated to be economically recoverable. These resources include relatively large volumes of oil (greater than 1 Bbbl) in the Santa Barbara-Ventura basin (1.17 Bbbl) and Bodega basin (1.03 Bbbl). At more favorable economic conditions, larger volumes of undiscovered economically recoverable oil resources are estimated to exist in these and other areas, particularly in the Point Arena and Oceanside-Capistrano basins.

Less than one half of the undiscovered conventionally recoverable gas resources of the Region (on the basis of mean estimates and the \$18-per-barrel economic scenario) is estimated to be economically recoverable. These resources include relatively large volumes of gas (greater than 1 Tcf) in the Santa Barbara-Ventura basin (2.91 Tcf) and Bodega basin (1.13 Tcf). At more favorable economic conditions, larger volumes of undiscovered economically recoverable gas resources are estimated to exist in these and other areas, particularly in the Point Arena basin, Washington-Oregon area, and Oceanside-Capistrano basin.

Table 3. Estimates of undiscovered conventionally recoverable oil and gas resources in the Pacific OCS Region as of January 1, 1995, by assessment area. All estimates are risked values. The low, mean, and high estimates correspond to the 95th -percentile, mean, and 5th -percentile values of a probability distribution, respectively. Percentile values are not additive; some total mean values may not equal the sum of the component values due to independent rounding.

Assessment Area	Oil (Bbbl)			Gas (Tcf)			BOE (Bbbl)		
	Low	Mean	High	Low	Mean	High	Low	Mean	High
Pacific Northwest Province									
Washington-Oregon Area	0.14	0.36	0.69	0.95	2.30	4.28	0.32	0.76	1.42
Eel River Basin	0.03	0.05	0.08	1.06	1.61	2.32	0.23	0.34	0.49
<i>Total Province</i>	<i>0.19</i>	<i>0.41</i>	<i>0.75</i>	<i>2.34</i>	<i>3.91</i>	<i>6.03</i>	<i>0.61</i>	<i>1.11</i>	<i>1.79</i>
Central California Province									
Point Arena Basin	1.50	2.03	2.66	1.45	2.14	3.01	1.77	2.41	3.18
Bodega Basin	0.97	1.42	1.98	1.00	1.57	2.30	1.16	1.70	2.37
Año Nuevo Basin	0.49	0.72	1.01	0.49	0.78	1.16	0.58	0.86	1.21
Santa Maria-Partington Basin	0.68	0.78	0.89	0.60	0.74	0.90	0.79	0.91	1.05
<i>Total Province</i>	<i>4.17</i>	<i>4.95</i>	<i>5.82</i>	<i>4.21</i>	<i>5.23</i>	<i>6.39</i>	<i>4.94</i>	<i>5.88</i>	<i>6.93</i>
Santa Barbara-Ventura Basin Province									
Santa Barbara-Ventura Basin	1.74	1.85	1.95	3.84	4.61	5.48	2.43	2.67	2.92
<i>Total Province</i>	<i>1.74</i>	<i>1.85</i>	<i>1.95</i>	<i>3.84</i>	<i>4.61</i>	<i>5.48</i>	<i>2.43</i>	<i>2.67</i>	<i>2.92</i>
Los Angeles Basin Province									
Los Angeles Basin	0.19	0.31	0.49	0.17	0.32	0.53	0.22	0.37	0.58
<i>Total Province</i>	<i>0.19</i>	<i>0.31</i>	<i>0.49</i>	<i>0.17</i>	<i>0.32</i>	<i>0.53</i>	<i>0.22</i>	<i>0.37</i>	<i>0.58</i>
Inner Borderland Province									
Santa Monica-San Pedro Area ¹	0.23	0.68	1.47	0.25	0.77	1.68	0.28	0.82	1.76
Oceanside-Capistrano Basin ¹	0	1.11	2.21	0	1.30	3.17	0	1.34	2.70
<i>Total Province¹</i>	<i>0.87</i>	<i>1.79</i>	<i>3.18</i>	<i>0.79</i>	<i>2.07</i>	<i>4.19</i>	<i>1.04</i>	<i>2.16</i>	<i>3.85</i>
Outer Borderland Province									
Santa Cruz-Santa Rosa Area	0	0.44	0.93	0	0.78	1.85	0	0.58	1.24
San Nicolas Basin	0	0.55	1.18	0	0.91	2.42	0	0.71	1.58
Cortes-Velero-Long Area	0	0.41	1.20	0	1.10	3.49	0	0.61	1.80
<i>Total Province</i>	<i>0.63</i>	<i>1.40</i>	<i>2.56</i>	<i>0.98</i>	<i>2.79</i>	<i>5.89</i>	<i>0.82</i>	<i>1.89</i>	<i>3.56</i>
<i>Total Pacific OCS Region¹</i>	<i>8.99</i>	<i>10.71</i>	<i>12.62</i>	<i>15.21</i>	<i>18.94</i>	<i>23.19</i>	<i>11.82</i>	<i>14.08</i>	<i>16.60</i>

¹ Includes a small area and volume of resources in the State offshore and/or onshore area adjacent to the Federal offshore area.

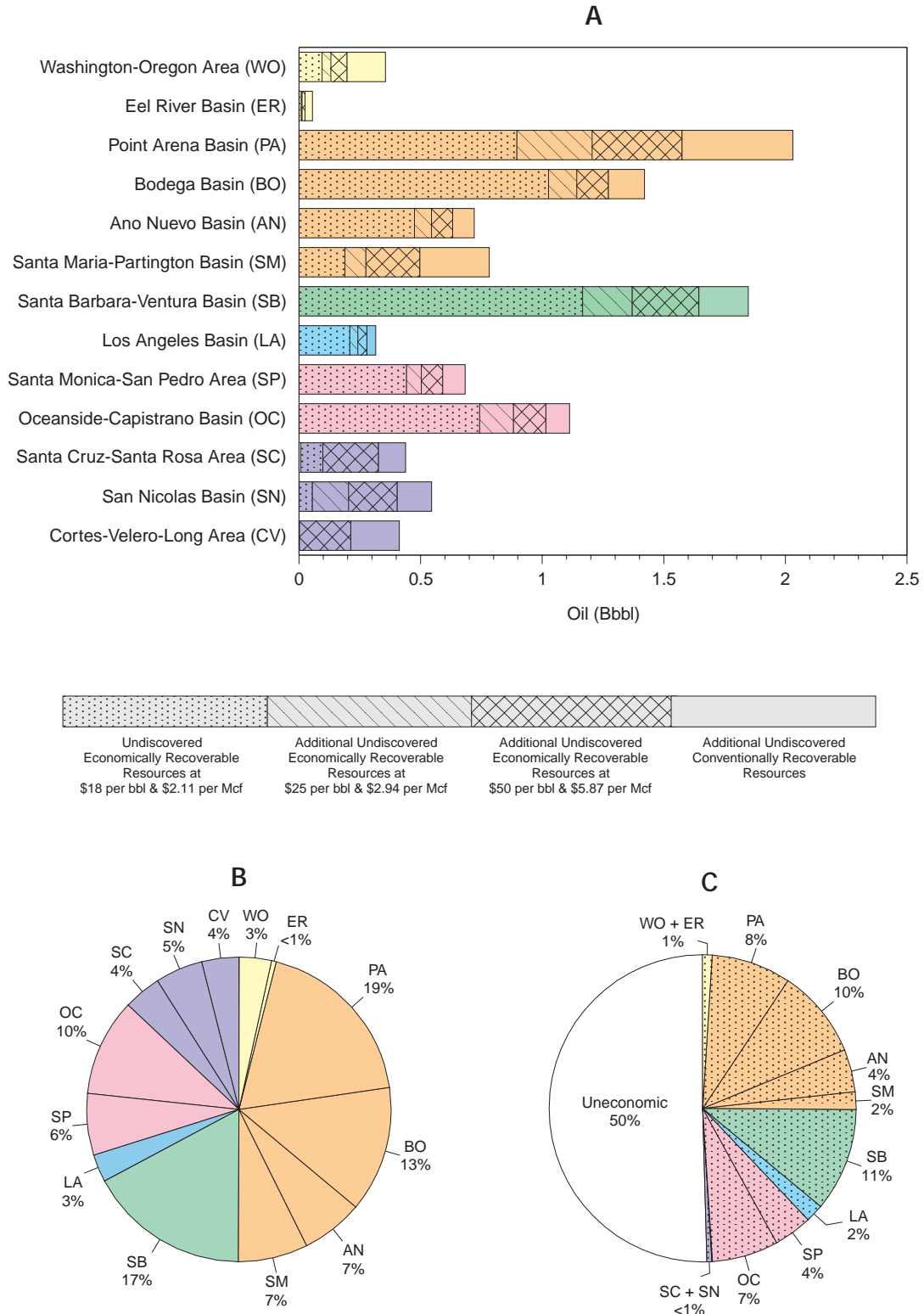


Figure 5. Distribution of undiscovered conventionally recoverable and economically recoverable oil resources in the Pacific OCS Region, by assessment area based on risked mean estimates listed in tables 3 and 4. Bar chart (A) shows incremental volumes of undiscovered economically recoverable oil resources for three economic scenarios and additional undiscovered conventionally recoverable oil resources; the entire bar represents the estimated total volume of undiscovered conventionally recoverable oil resources. Pie charts show proportionate volumes of undiscovered conventionally recoverable oil resources (B) and undiscovered conventionally recoverable oil resources that are economically recoverable versus uneconomic at the \$18-per-bbl scenario (C). The sum of the percentage values in some pie charts may not equal 100 percent due to independent rounding.

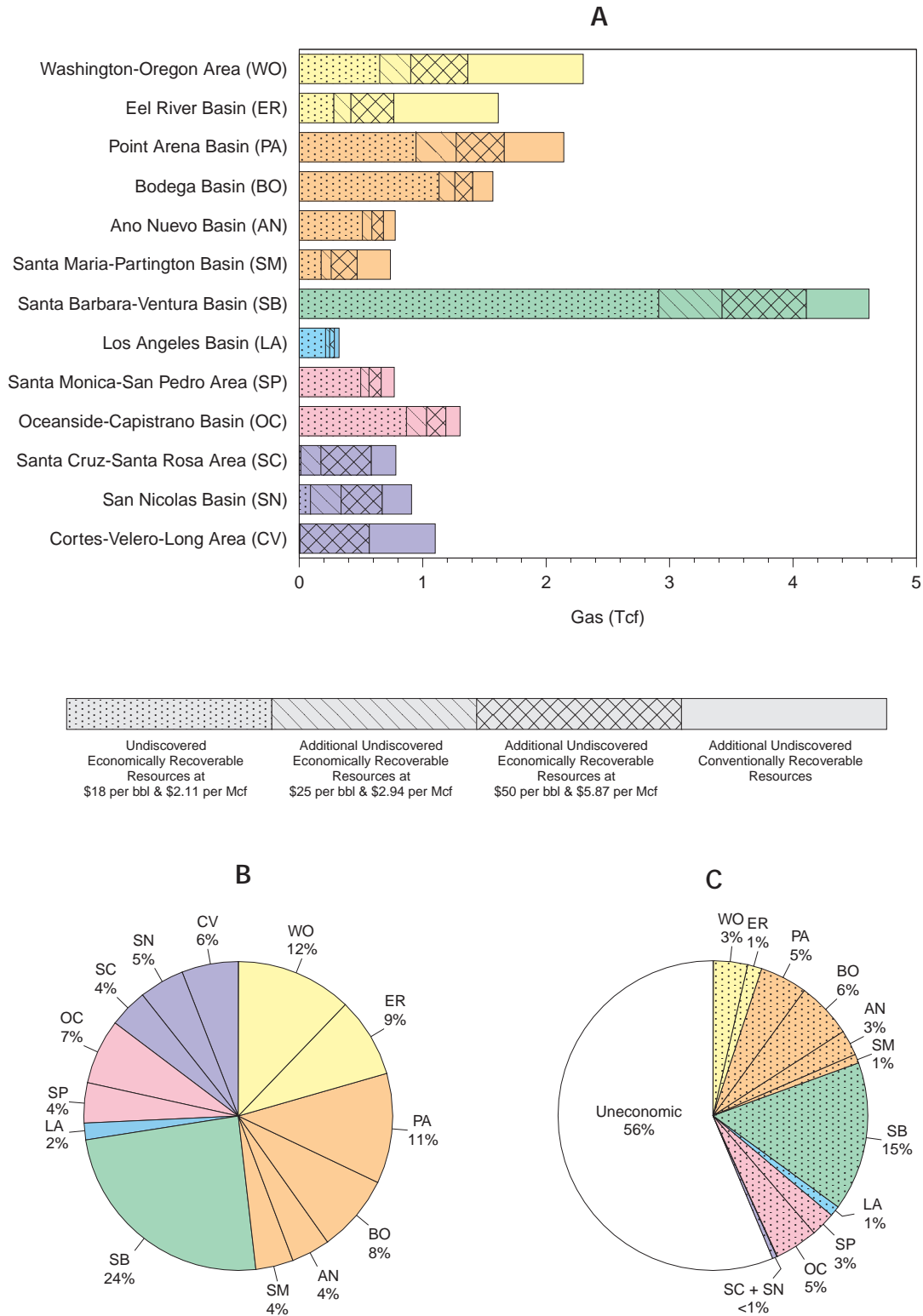


Figure 6. Distribution of undiscovered conventionally recoverable and economically recoverable gas resources in the Pacific OCS Region, by assessment area based on risked mean estimates listed in tables 3 and 4. Bar chart (A) shows incremental volumes of undiscovered economically recoverable gas resources for three economic scenarios and additional undiscovered conventionally recoverable gas resources; the entire bar represents the estimated total volume of undiscovered conventionally recoverable gas resources. Pie charts show proportionate volumes of undiscovered conventionally recoverable gas resources (B) and undiscovered conventionally recoverable gas resources that are economically recoverable versus uneconomic at the \$18-per-bbl scenario (C). The sum of the percentage values in some pie charts may not equal 100 percent due to independent rounding.

Table 4. Estimates of undiscovered economically recoverable oil and gas resources in the Pacific OCS Region as of January 1, 1995, for four economic scenarios, by assessment area. All estimates are risked mean values. The \$18-per-barrel scenario is based on prices of \$18 per bbl of oil and \$2.11 per Mcf of gas; the \$25-per-barrel scenario is based on prices of \$25 per bbl of oil and \$2.94 per Mcf of gas; the \$30-per-barrel scenario is based on prices of \$30 per bbl of oil and \$3.52 per Mcf of gas; the \$50-per-barrel scenario is based on prices of \$50 per bbl of oil and \$5.87 per Mcf of gas. Some total values may not equal the sum of the component values due to independent rounding.

Assessment Area	\$18-per-barrel Scenario			\$25-per-barrel Scenario			\$30-per-barrel Scenario			\$50-per-barrel Scenario		
	Oil (Bbbl)	Gas (Tcf)	BOE (Bbbl)	Oil (Bbbl)	Gas (Tcf)	BOE (Bbbl)	Oil (Bbbl)	Gas (Tcf)	BOE (Bbbl)	Oil (Bbbl)	Gas (Tcf)	BOE (Bbbl)
Pacific Northwest Province												
Washington-Oregon Area	0.09	0.65	0.21	0.13	0.90	0.29	0.15	1.03	0.33	0.20	1.37	0.44
Eel River Basin	<0.01	0.28	0.06	0.01	0.42	0.09	0.02	0.51	0.11	0.03	0.77	0.16
<i>Total Province</i>	<i>0.10</i>	<i>0.93</i>	<i>0.27</i>	<i>0.14</i>	<i>1.32</i>	<i>0.38</i>	<i>0.16</i>	<i>1.54</i>	<i>0.44</i>	<i>0.22</i>	<i>2.13</i>	<i>0.60</i>
Central California Province												
Point Arena Basin	0.90	0.95	1.06	1.21	1.27	1.43	1.32	1.39	1.57	1.58	1.66	1.87
Bodega Basin	1.03	1.13	1.23	1.14	1.26	1.37	1.19	1.32	1.42	1.27	1.41	1.52
Año Nuevo Basin	0.48	0.51	0.57	0.55	0.59	0.65	0.58	0.62	0.69	0.63	0.68	0.75
Santa Maria-Partington Basin	0.19	0.18	0.22	0.28	0.26	0.32	0.34	0.32	0.40	0.50	0.47	0.58
<i>Total Province</i>	<i>2.59</i>	<i>2.77</i>	<i>3.08</i>	<i>3.17</i>	<i>3.38</i>	<i>3.77</i>	<i>3.42</i>	<i>3.65</i>	<i>4.07</i>	<i>3.98</i>	<i>4.22</i>	<i>4.73</i>
Santa Barbara-Ventura Basin Province												
Santa Barbara-Ventura Basin	1.17	2.91	1.68	1.37	3.43	1.98	1.46	3.64	2.10	1.64	4.11	2.38
<i>Total Province</i>	<i>1.17</i>	<i>2.91</i>	<i>1.68</i>	<i>1.37</i>	<i>3.43</i>	<i>1.98</i>	<i>1.46</i>	<i>3.64</i>	<i>2.10</i>	<i>1.64</i>	<i>4.11</i>	<i>2.38</i>
Los Angeles Basin Province												
Los Angeles Basin	0.21	0.21	0.25	0.24	0.25	0.29	0.25	0.26	0.30	0.28	0.29	0.33
<i>Total Province</i>	<i>0.21</i>	<i>0.21</i>	<i>0.25</i>	<i>0.24</i>	<i>0.25</i>	<i>0.29</i>	<i>0.25</i>	<i>0.26</i>	<i>0.30</i>	<i>0.28</i>	<i>0.29</i>	<i>0.33</i>
Inner Borderland Province												
Santa Monica-San Pedro Area ¹	0.44	0.50	0.53	0.50	0.57	0.60	0.53	0.60	0.64	0.59	0.66	0.71
Oceanside-Capistrano Basin ¹	0.74	0.87	0.90	0.88	1.03	1.07	0.93	1.08	1.12	1.02	1.19	1.23
<i>Total Province¹</i>	<i>1.19</i>	<i>1.37</i>	<i>1.43</i>	<i>1.39</i>	<i>1.60</i>	<i>1.67</i>	<i>1.46</i>	<i>1.68</i>	<i>1.75</i>	<i>1.61</i>	<i>1.85</i>	<i>1.94</i>
Outer Borderland Province												
Santa Cruz-Santa Rosa Area	<0.01	0.01	0.01	0.10	0.18	0.13	0.17	0.30	0.22	0.33	0.58	0.43
San Nicolas Basin	0.06	0.09	0.07	0.20	0.34	0.26	0.29	0.48	0.38	0.40	0.67	0.52
Cortes-Velero-Long Area	0	0	0	<0.01	<0.01	<0.01	0.03	0.09	0.05	0.21	0.57	0.31
<i>Total Province</i>	<i>0.06</i>	<i>0.10</i>	<i>0.08</i>	<i>0.30</i>	<i>0.52</i>	<i>0.40</i>	<i>0.49</i>	<i>0.86</i>	<i>0.64</i>	<i>0.94</i>	<i>1.83</i>	<i>1.27</i>
<i>Total Pacific OCS Region¹</i>	<i>5.31</i>	<i>8.30</i>	<i>6.79</i>	<i>6.61</i>	<i>10.49</i>	<i>8.48</i>	<i>7.23</i>	<i>11.62</i>	<i>9.30</i>	<i>8.67</i>	<i>14.42</i>	<i>11.24</i>

¹ Includes a small area and volume of resources in the State offshore and/or onshore area adjacent to the Federal offshore area.

TOTAL RESOURCE ENDOWMENT

The estimates of total resource endowment presented here are the aggregate volume of discovered resources and undiscovered conventionally recoverable resources and reflect resource volumes as of January 1, 1999.

Volume

The total resource endowment of the Region is estimated to be 13.35 Bbbl of oil and 22.02 Tcf of gas. This estimated endowment is composed of 2.64 Bbbl and 3.08 Tcf of discovered resources (originally recoverable reserves) and 10.71 Bbbl and 18.94 Tcf of undiscovered conventionally recoverable resources (risky mean estimates).

Geographic Distribution

The total resource endowment of the Region is estimated to exist in 13 assessment areas (fig. 1). Estimates of the total resource endowment in each assessment area are listed in table 5. The distribution of the total endowment of oil and gas resources among the assessment areas is illustrated in figures 7A and 8A.

Approximately three quarters of the total endowment of combined oil-equivalent resources of the Region are estimated to be oil. Relatively large endowments of oil resources (greater than 1 Bbbl) are estimated to exist in the Santa Barbara-Ventura basin (2.95 Bbbl), Point Arena basin (2.03 Bbbl), Santa Maria-Partington basin (2.21 Bbbl), Bodega

basin (1.42 Bbbl), and Oceanside-Capistrano basin (1.11 Bbbl).

Approximately one quarter of the total endowment of combined oil-equivalent resources of the Region is estimated to be gas. Relatively large endowments of gas resources (greater than 1 Tcf) are estimated to exist in the Santa Barbara-Ventura basin (6.80 Tcf), Washington-Oregon area (2.30 Tcf), Point Arena basin (2.14 Tcf), Eel River basin (1.61 Tcf), Santa Maria-Partington Basin (1.60 Tcf), Bodega basin (1.57 Tcf), Oceanside-Capistrano basin (1.30 Tcf), and Cortes-Velero-Long area (1.10 Tcf).

Discovered versus Undiscovered Resources

Undiscovered resources are estimated to compose a major portion (on the basis of mean estimates) of the total oil and gas resource endowment of the Region (figs. 7B and 8B); however, the relative proportion of discovered and undiscovered resources varies by area.

In the Santa Maria-Partington basin, more than one half of the total oil and gas endowments have been discovered (figs. 7C and 8C). In the Santa Barbara-Ventura basin, approximately one third of the total oil and gas endowments has been discovered (figs. 7D and 8D). In the Los Angeles basin, approximately one third of the total oil endowment and one tenth of the total gas endowment have been discovered (figs. 7E and 8E).

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- Dunkel, C.A., and Piper, K.A., 1997, 1995 National Assessment of United States oil and gas resources—Assessment of the Pacific Outer Continental Shelf Region: Minerals Management Service OCS Report MMS 97-0019, 207 p., 6 app.
- Sorensen, S.B., Syms, H.E., and Voskanian, A., 2000, Estimated oil and gas reserves, Pacific Outer Continental Shelf (as of December 31, 1998): Minerals Management Service OCS Report MMS 2000-063, 21 pages, 3 app.

Table 5. Estimates of the total endowment of oil and gas resources in the Pacific OCS Region, by assessment area. Estimates of discovered resources (including cumulative production and remaining reserves) are as of January 1, 1999. Estimates of undiscovered conventionally recoverable resources are as of January 1, 1995, and are risked mean values. Some total values may not equal the sum of the component values due to independent rounding.

Assessment Area	Discovered Resources (Reserves)						Undiscovered Conventionally Recoverable Resources			Total Resource Endowment		
	Cumulative Production			Remaining Reserves			Oil (Bbbl)	Gas (Tcf)	BOE (Bbbl)	Oil (Bbbl)	Gas (Tcf)	BOE (Bbbl)
	Oil (Bbbl)	Gas (Tcf)	BOE (Bbbl)	Oil (Bbbl)	Gas (Tcf)	BOE (Bbbl)						
Pacific Northwest Province												
Washington-Oregon Area	0	0	0	0	0	0	0.36	2.30	0.76	0.36	2.30	0.77
Eel River Basin	0	0	0	0	0	0	0.05	1.61	0.34	0.06	1.61	0.34
<i>Total Province</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0.41</i>	<i>3.91</i>	<i>1.11</i>	<i>0.41</i>	<i>3.91</i>	<i>1.11</i>
Central California Province												
Point Arena Basin	0	0	0	0	0	0	2.03	2.14	2.41	2.03	2.14	2.41
Bodega Basin	0	0	0	0	0	0	1.42	1.57	1.70	1.42	1.57	1.70
Año Nuevo Basin	0	0	0	0	0	0	0.72	0.78	0.86	0.72	0.78	0.86
Santa Maria-Partington Basin	0.19	0.08	0.21	1.24	0.78	1.38	0.78	0.74	0.91	2.21	1.60	2.50
<i>Total Province</i>	<i>0.19</i>	<i>0.08</i>	<i>0.21</i>	<i>1.24</i>	<i>0.78</i>	<i>1.38</i>	<i>4.95</i>	<i>5.23</i>	<i>5.88</i>	<i>6.38</i>	<i>6.09</i>	<i>7.47</i>
Santa Barbara-Ventura Basin Province												
Santa Barbara-Ventura Basin	0.65	0.77	0.78	0.45	1.42	0.71	1.85	4.61	2.95	2.95	6.80	4.16
<i>Total Province</i>	<i>0.65</i>	<i>0.77</i>	<i>0.78</i>	<i>0.45</i>	<i>1.42</i>	<i>0.71</i>	<i>1.85</i>	<i>4.61</i>	<i>2.95</i>	<i>2.95</i>	<i>6.80</i>	<i>4.16</i>
Los Angeles Basin Province												
Los Angeles Basin	0.08	0.03	0.08	0.03	<0.01	0.03	0.31	0.32	0.37	0.43	0.36	0.49
<i>Total Province</i>	<i>0.08</i>	<i>0.03</i>	<i>0.08</i>	<i>0.03</i>	<i><0.01</i>	<i>0.03</i>	<i>0.31</i>	<i>0.32</i>	<i>0.37</i>	<i>0.43</i>	<i>0.36</i>	<i>0.49</i>
Inner Borderland Province												
Santa Monica-San Pedro Area ¹	0	0	0	0	0	0	0.68	0.77	0.82	0.68	0.77	0.82
Oceanside-Capistrano Basin ¹	<0.01	<0.01	<0.01	negligible			1.11	1.30	1.34	1.11	1.30	1.34
<i>Total Province¹</i>	<i><0.01</i>	<i><0.01</i>	<i><0.01</i>	<i>negligible</i>			<i>1.79</i>	<i>2.07</i>	<i>2.16</i>	<i>1.79</i>	<i>2.07</i>	<i>2.16</i>
Outer Borderland Province												
Santa Cruz-Santa Rosa Area	0	0	0	0	0	0	0.44	0.78	0.58	0.44	0.78	0.58
San Nicolas Basin	0	0	0	0	0	0	0.55	0.91	0.71	0.55	0.91	0.71
Cortes-Velero-Long Area	0	0	0	0	0	0	0.41	1.10	0.61	0.41	1.10	0.61
<i>Total Province</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>1.40</i>	<i>2.79</i>	<i>1.89</i>	<i>1.40</i>	<i>2.79</i>	<i>1.89</i>
<i>Total Pacific OCS Region¹</i>	<i>0.92</i>	<i>0.87</i>	<i>1.07</i>	<i>1.72</i>	<i>2.21</i>	<i>2.12</i>	<i>10.71</i>	<i>18.94</i>	<i>14.08</i>	<i>13.35</i>	<i>22.02</i>	<i>17.27</i>

¹ Includes a small area and volume of resources in the State offshore and/or onshore area adjacent to the Federal offshore area.

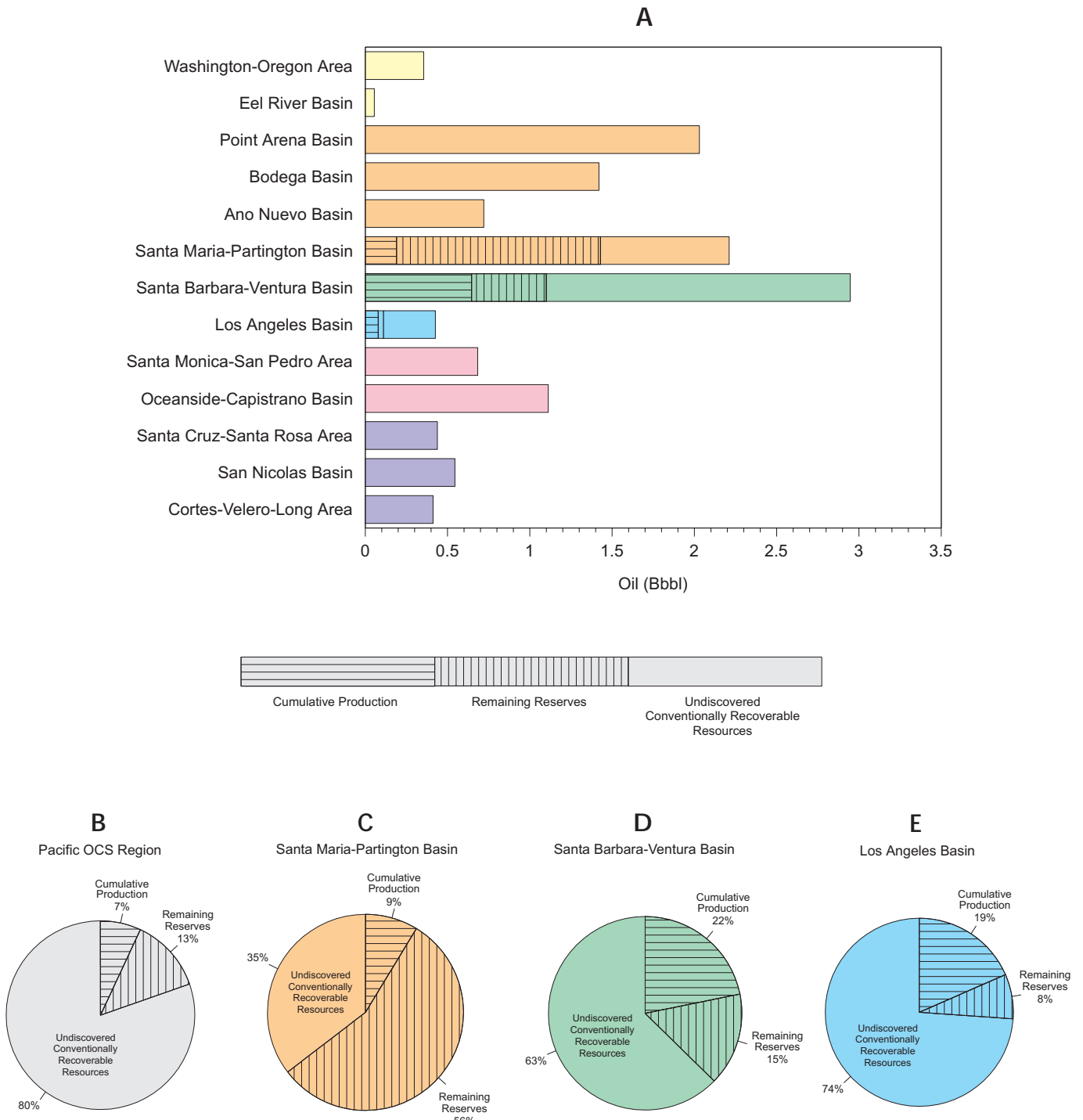


Figure 7. Distribution of the total endowment of oil resources in the Pacific OCS Region, by assessment area based on estimates listed in [table 5](#). Bar chart (A) shows incremental volumes of discovered oil resources (including cumulative production and remaining reserves) and undiscovered conventionally recoverable oil resources; the entire bar represents the estimated total endowment of oil resources. Pie charts show proportionate volumes of discovered oil resources and undiscovered oil resources in the Pacific OCS Region (B), Santa Maria-Partington Basin assessment area (C), Santa Barbara-Ventura Basin assessment area (D), and Los Angeles Basin assessment area (E). The sum of the percentage values in some pie charts may not equal 100 percent due to independent rounding.

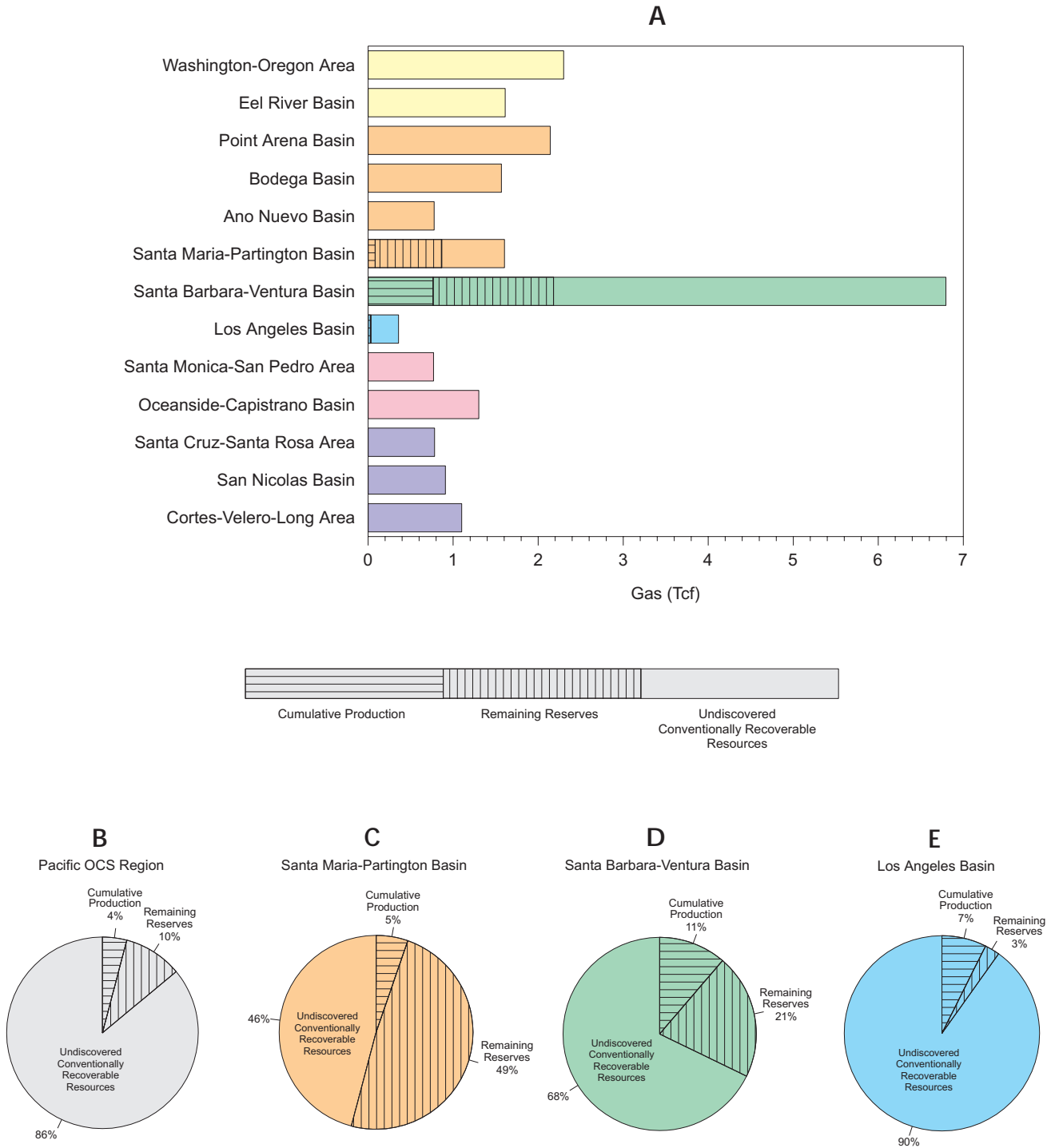


Figure 8. Distribution of the total endowment of gas resources in the Pacific OCS Region, by assessment area based on estimates listed in table 5. Bar chart (A) shows incremental volumes of discovered gas resources (including cumulative production and remaining reserves) and undiscovered conventionally recoverable gas resources; the entire bar represents the estimated total endowment of gas resources. Pie charts show proportionate volumes of discovered gas resources and undiscovered gas resources in the Pacific OCS Region (B), Santa Maria-Partington Basin assessment area (C), Santa Barbara-Ventura Basin assessment area (D), and Los Angeles Basin assessment area (E). The sum of the percentage values in some pie charts may not equal 100 percent due to independent rounding.



The Department of the Interior Mission

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



The Minerals Management Service Mission

As a bureau of the Department of the Interior, the Minerals Management Service's (MMS) primary responsibilities are to manage the mineral resources located on the Nation's Outer Continental Shelf (OCS), collect revenue from the Federal OCS and onshore Federal and Indian lands, and distribute those revenues.

Moreover, in working to meet its responsibilities, the **Offshore Minerals Management Program** administers the OCS competitive leasing program and oversees the safe and environmentally sound exploration and production of our Nation's offshore natural gas, oil and other mineral resources. The MMS **Royalty Management Program** meets its responsibilities by ensuring the efficient, timely and accurate collection and disbursement of revenue from mineral leasing and production due to Indian tribes and allottees, States and the U.S. Treasury.

The MMS strives to fulfill its responsibilities through the general guiding principles of: (1) being responsive to the public's concerns and interests by maintaining a dialogue with all potentially affected parties and (2) carrying out its programs with an emphasis on working to enhance the quality of life for all Americans by lending MMS assistance and expertise to economic development and environmental protection.