

Write Off the Pacific Offshore? *or* the Last Best Hope for New Pacific Discoveries*

Kenneth A. Piper¹ and Michael R. Brickey²

Search and Discovery Article #30409 (2015)**

Posted August 3, 2015

*Adapted from oral presentation given at Pacific Section AAPG, SEG and SEPM Joint Technical Conference, Oxnard, California, May 3-5, 2015

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Abstract

The Bureau of Ocean Energy Management (BOEM) and the Minerals Management Service before it have ranked the Santa Barbara, Santa Maria, and Oceanside basins (not necessarily in that order) as the best prospects for future oil and gas discovery and development in the Pacific Federal offshore. All basins to the north and the distal basins of the Southern California Borderland have either economic or political constraints that rule out future leasing and exploration. However, the discovery history shows that for Santa Barbara and Santa Maria basins (and San Pedro as well), the “easy oil” has been found (except for one untested prospect). In fact, all production is from the first one or two lease sale offerings in each respective area, and almost all is from the first offering. The exception is a prospect within the Federal ecological preserve that surrounds Santa Barbara Harbor. It is on trend with the Dos Cuadras and Carpinteria fields to the east and may have recoverable resources of 100 MMbbl. Because of this, continued leasing efforts and exploration are unlikely to result in additional economically recoverable resources for the Santa Barbara offshore basin. In Santa Maria basin, the only resources of interest for future leasing are within those leases that were bought back by the Federal government following lawsuits by the State and oil companies that were unable to develop their discovered resources. Those leases are believed to contain about 1 billion barrels of recoverable oil, and would therefore be of interest to companies that are willing to fight the inevitable anti-oil efforts by environmental and other groups. The last best hope, then, is the yet unexplored Oceanside basin. Because it is on trend with the Los Angeles basin major oilfields, and has many mapped and sizeable prospects, it has long been of interest to government geologists. Efforts in the 1980's to include it in lease offerings were unsuccessful, primarily because of opposition by the U.S. military, which has operations offshore of Camp Pendleton Marine base in northern San Diego County. As the population of San Diego County has greatly increased since that time, it is almost certain that there will be enormous political opposition to any proposed leasing in the Oceanside basin. Is it any wonder that BOEM has tacitly written off oil and gas for the Pacific Region.

References Cited

Lee, P.J., and P.C.C. Wang, 1984, PRIMES: A petroleum resources information management and evaluation system: Oil and Gas Journal, v. 82/40, p. 204-206.

Lee, P.J., and P.C.C. Wang, 1985, Prediction of oil or gas pool sizes when discovery record is available: *Mathematical Geology*, v. 17/2, p. 95-113.

Lee, P.J., and P.C.C. Wang, 1990, An introduction to petroleum resource evaluation methods: Canadian Society of Petroleum Geologists Course Notes, Geological Survey of Canada Contribution No. 51789, 108 p.

Write off the Pacific Offshore?
or
The last best hope for new Pacific discoveries

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and
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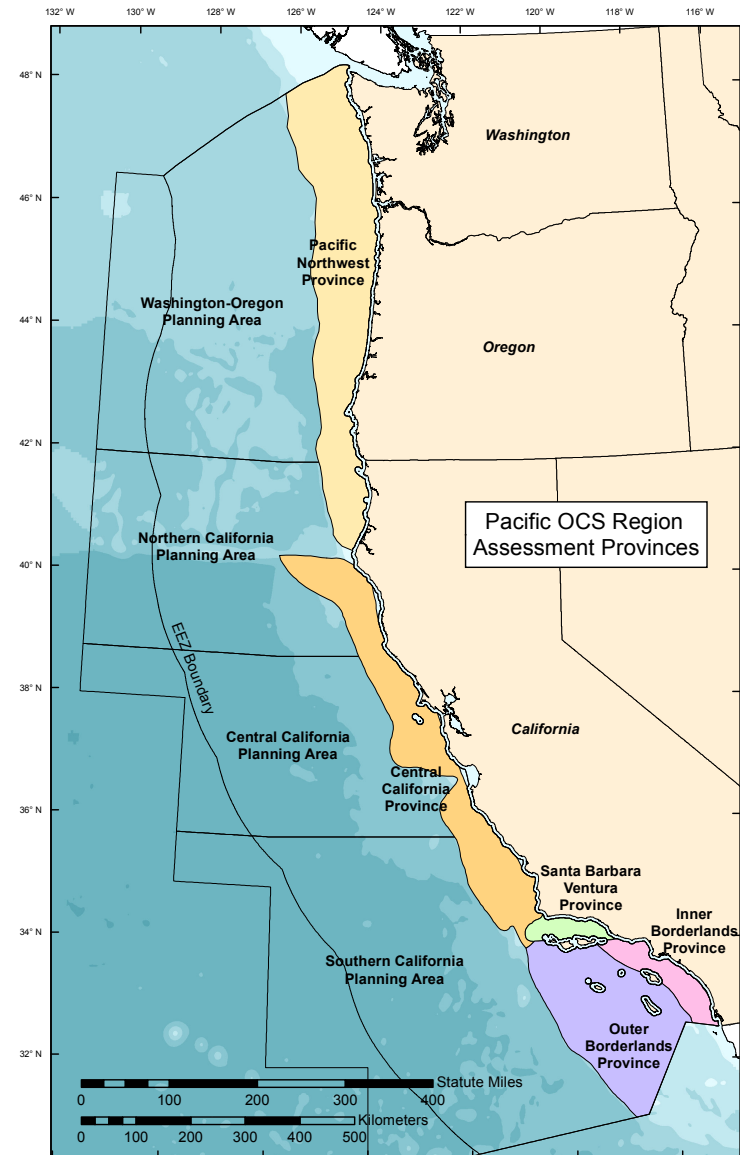
kineticpotentialenergy.com

Write off the Pacific Offshore?

The USGS, Minerals Management Service, and now the Bureau of Ocean Energy Management have been doing periodic assessments of oil and gas potential in the Pacific OCS (Outer Continental Shelf) for decades. Is it now time to reassess that policy? Consider that:

- There is no new geological or geophysical data outside of producing fields in the last 25 years.
- There has been little change in the estimates of technically recoverable resources since the 1995 assessment.
- There has been no leasing on the Pacific OCS since 1984.
- There has been no leasing north of Santa Maria Basin since 1964.

What is the cost of ongoing assessments?
What is the likelihood of future leasing?
Where should oil and gas companies focus their efforts? Or should they even bother?



Write off the Pacific Offshore?

Mean estimates

Technically recoverable resources

10.2 Bbbl oil, 16.1 Tcf gas

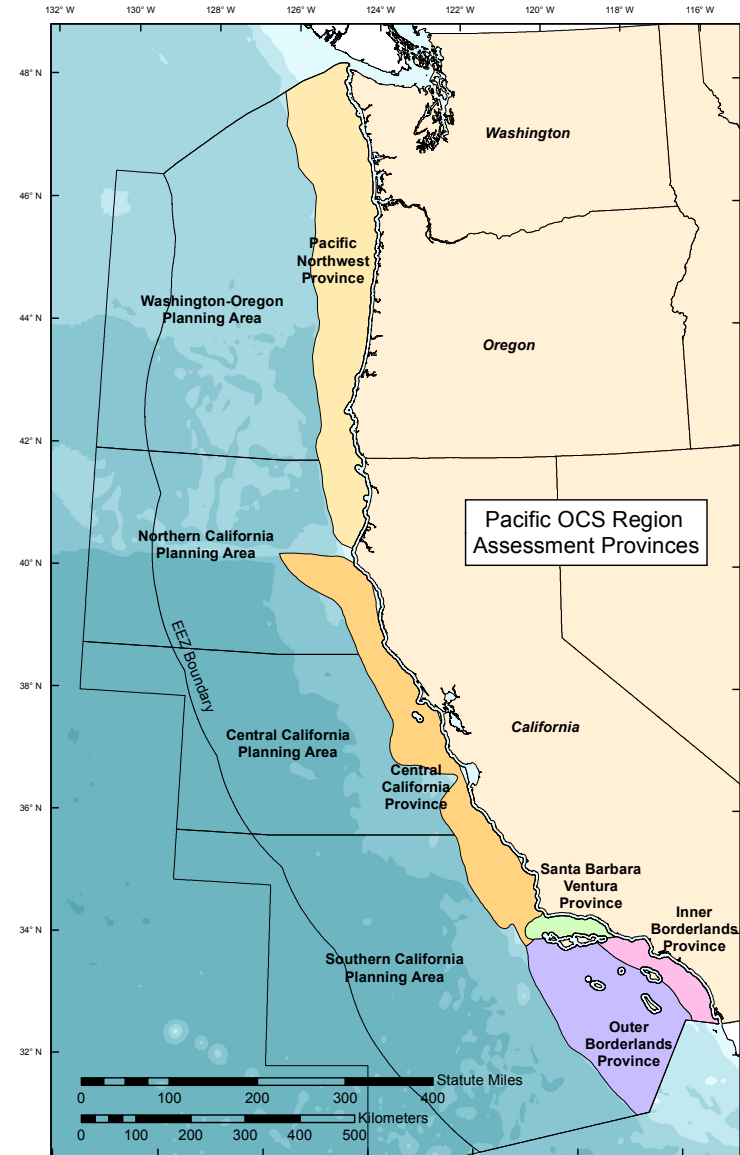
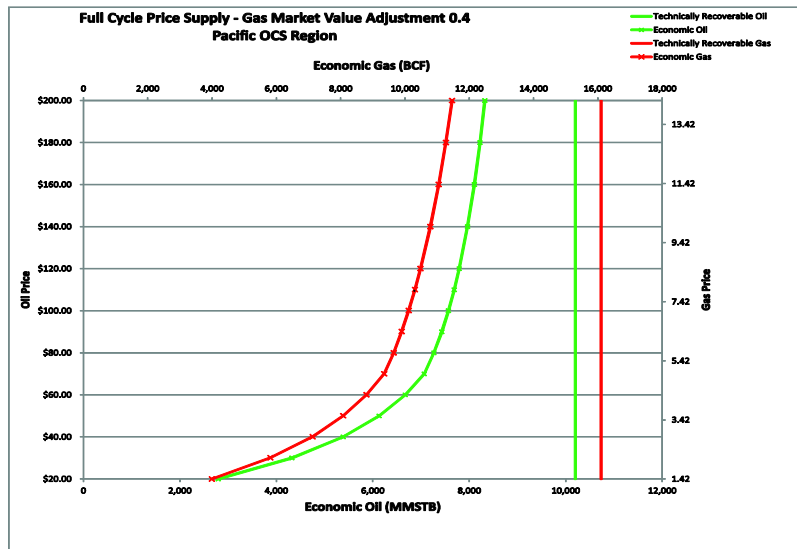
Economically recoverable resources

At \$90/bbl oil, \$6.41/Mcf gas

- 7.43 billion barrels of oil
- 9.90 trillion cubic feet of gas

At \$60/bbl oil, \$4.27/Mcf gas

- 6.67 billion barrels of oil
- 8.80 trillion cubic feet of gas



Washington-Oregon?

Mean estimates

Technically recoverable resources

- 398 million barrels of oil
- 2,233 billion cubic feet of natural gas

Economically recoverable resources

At \$90/bbl oil, \$6.50/Mcf gas

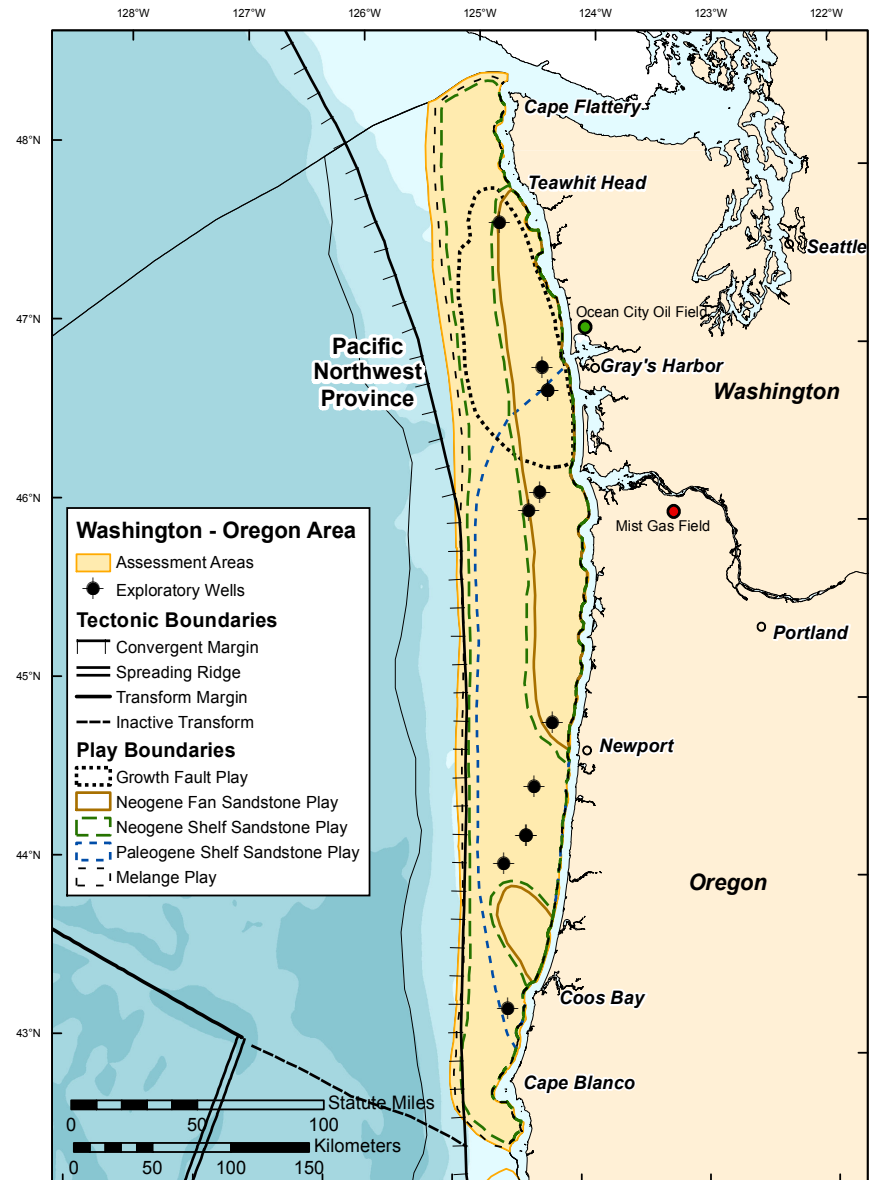
- 242 million barrels of oil
- 884 billion cubic feet of natural gas

At \$60/bbl oil, \$4.27/Mcf gas

- 210 million barrels of oil
- 731 billion cubic feet of natural gas

Largest expected field less than 100 MMbbl;
perhaps 6 over 20MMbbl

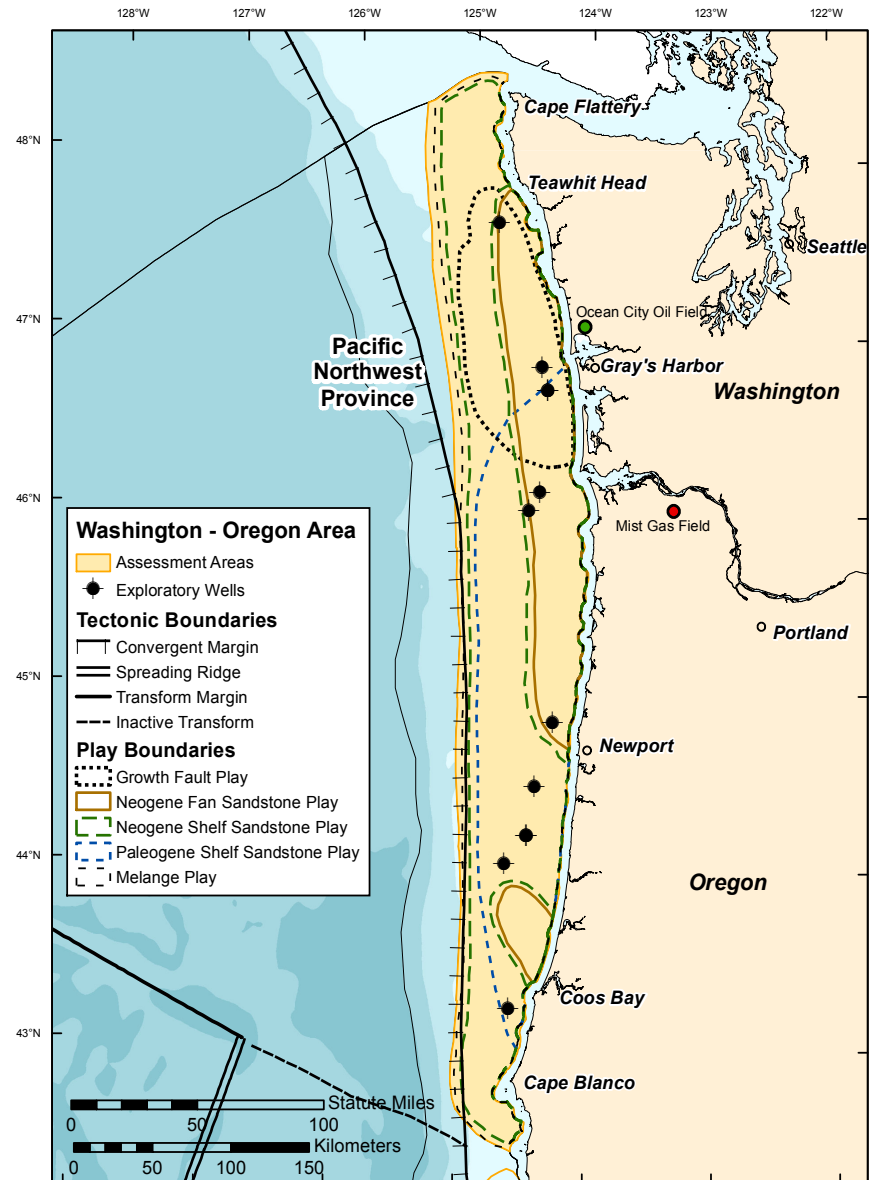
18,000 square miles



Washington-Oregon?

ECONOMIC AND POLITICAL FACTORS

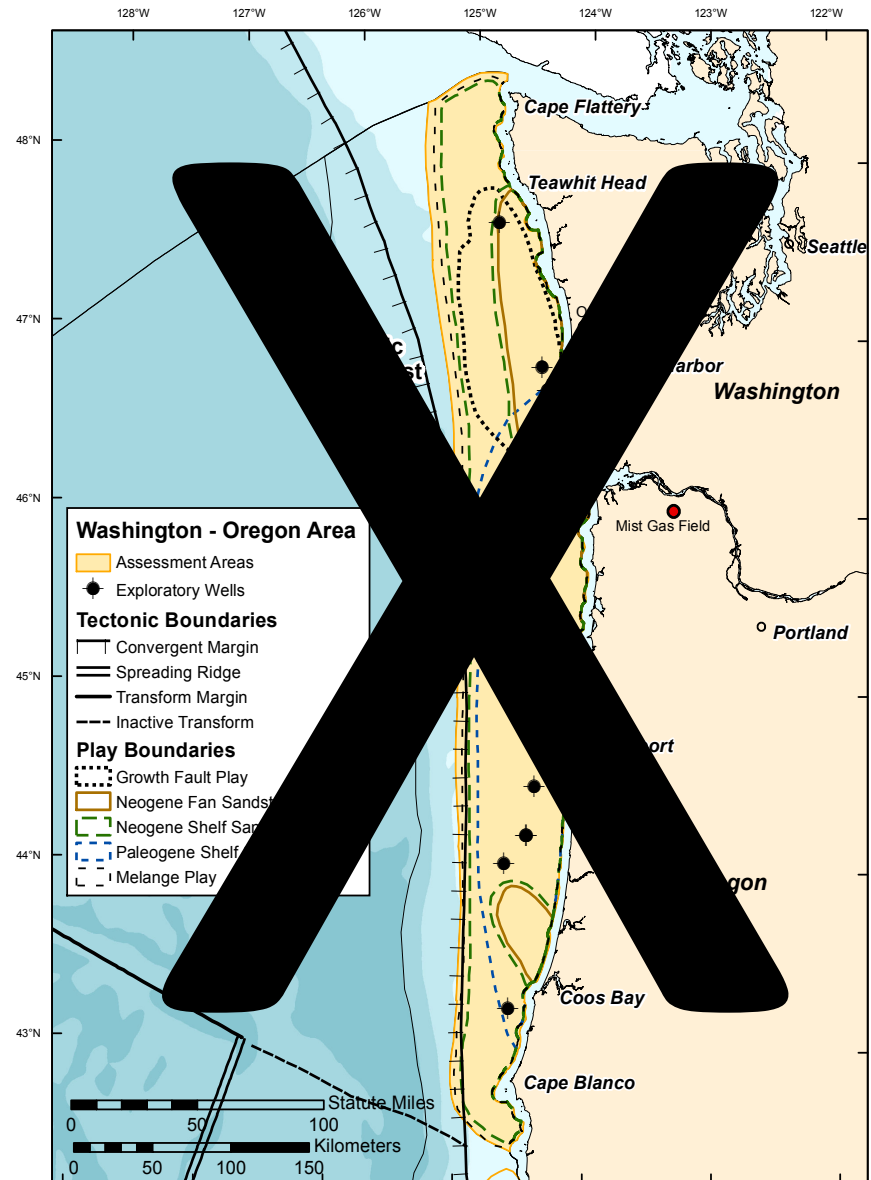
There is little oil and gas infrastructure on the coastline in the Washington–Oregon Area, and no large coastal cities. Should there be any future development, pipelines could be shared among multiple platforms or subsea completions and tied to shore at one or more of several coastal harbor towns. This would minimize both cost and environmental impacts. However, the relatively low resources compared to the extremely large area involved, combined with strong local opposition, make any offshore development unlikely.



Washington-Oregon?

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Eel River basin?

Mean estimates

Technically recoverable resources

- 72 million barrels of oil
- 1,524 billion cubic feet of natural gas

Economically recoverable resources

At \$90/bbl oil, \$6.50/Mcf gas

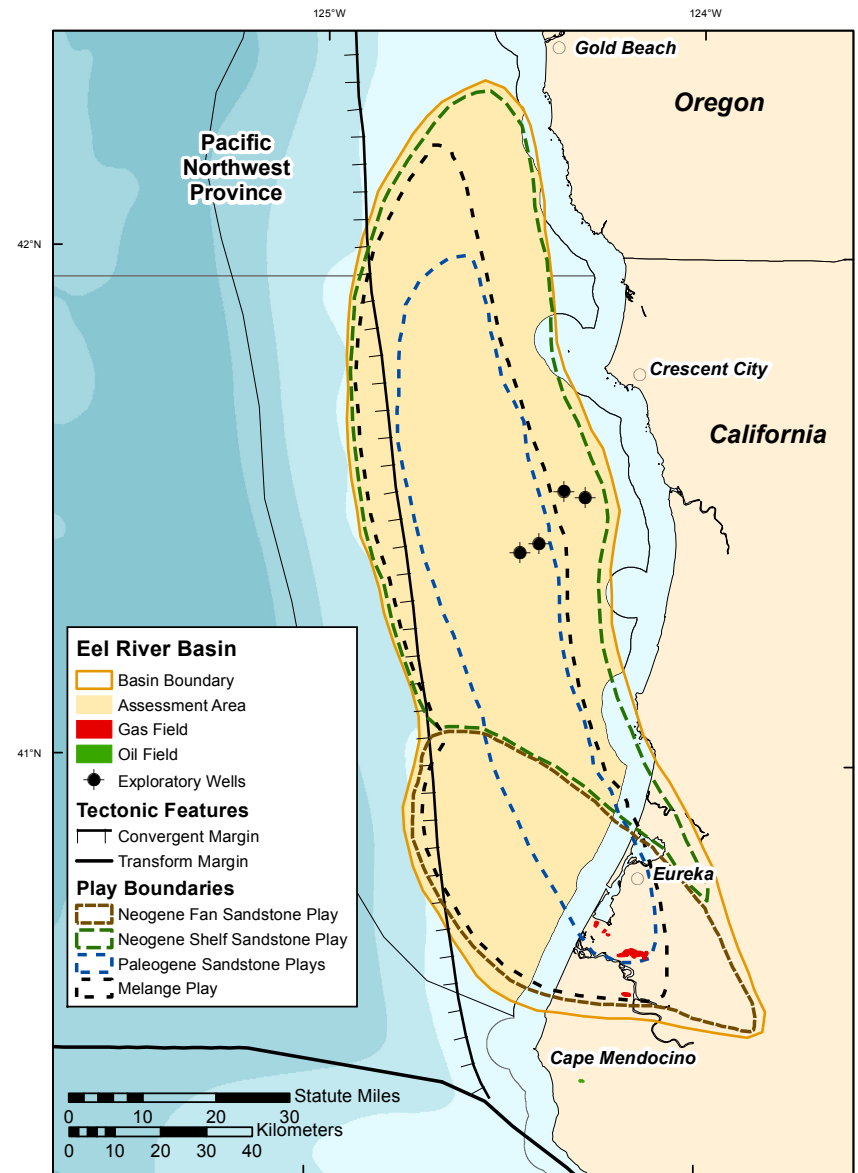
- 38 million barrels of oil
- 291 billion cubic feet of natural gas

At \$60/bbl oil, \$4.27/Mcf gas

- 30 million barrels of oil
- 184 billion cubic feet of natural gas

Largest field probably gas, about 170 Bcf,
perhaps 6 over 10MMbbl (or 56 Bcf)

3,200 square miles

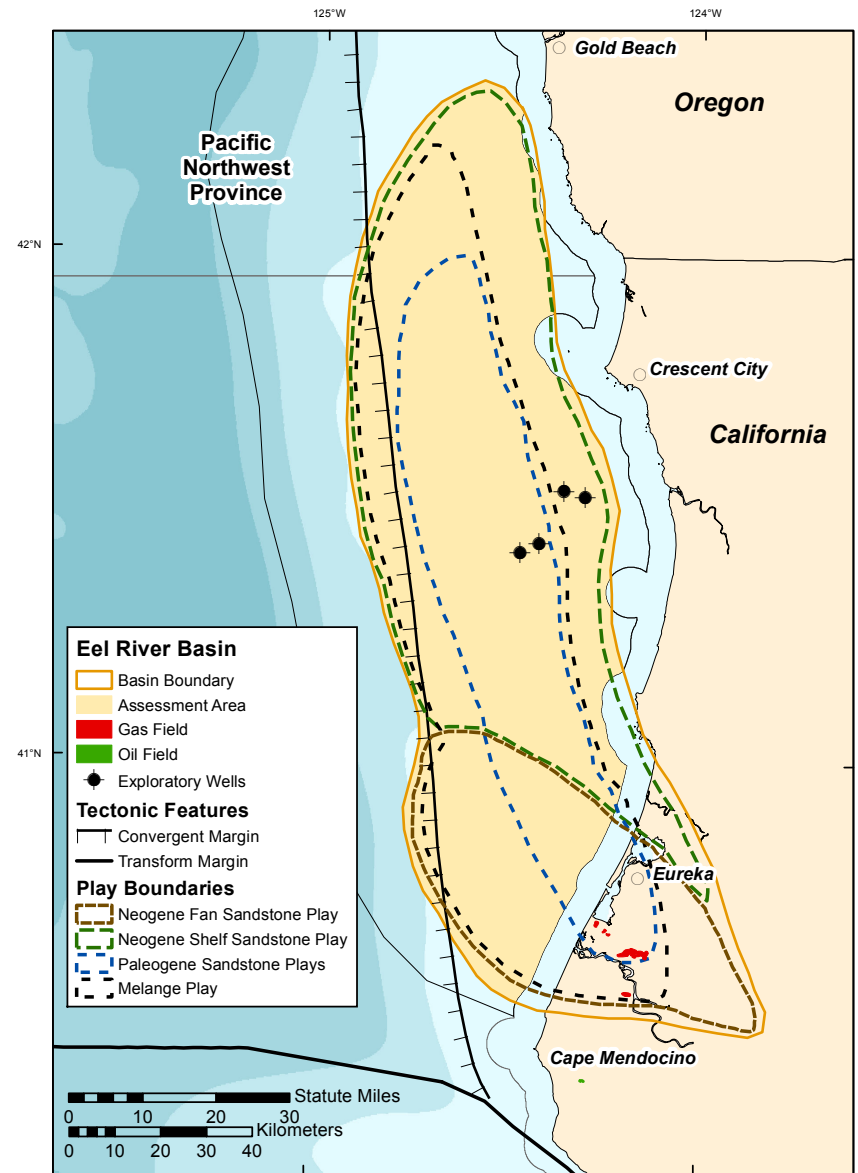


Eel River basin?

OUTLOOK

There is insufficient potential to make it economic to connect to major onshore pipelines. However, the large prospects with the most potential are in the southern 1/5 of the basin, near the population center. When the gas runs out in the onshore Tompkins Hill and Grizzly Bluff fields, a few subsea wells into the largest offshore prospect would fulfill local needs for another 100 years.

- Southern offshore is an extension of the onshore basin, which is gas rich.
- Several offshore prospects have been mapped, the largest similar in size to onshore Tompkins Hill field (120 Bcf).
- Abundant seeps indicate high probability of success for a gas field.

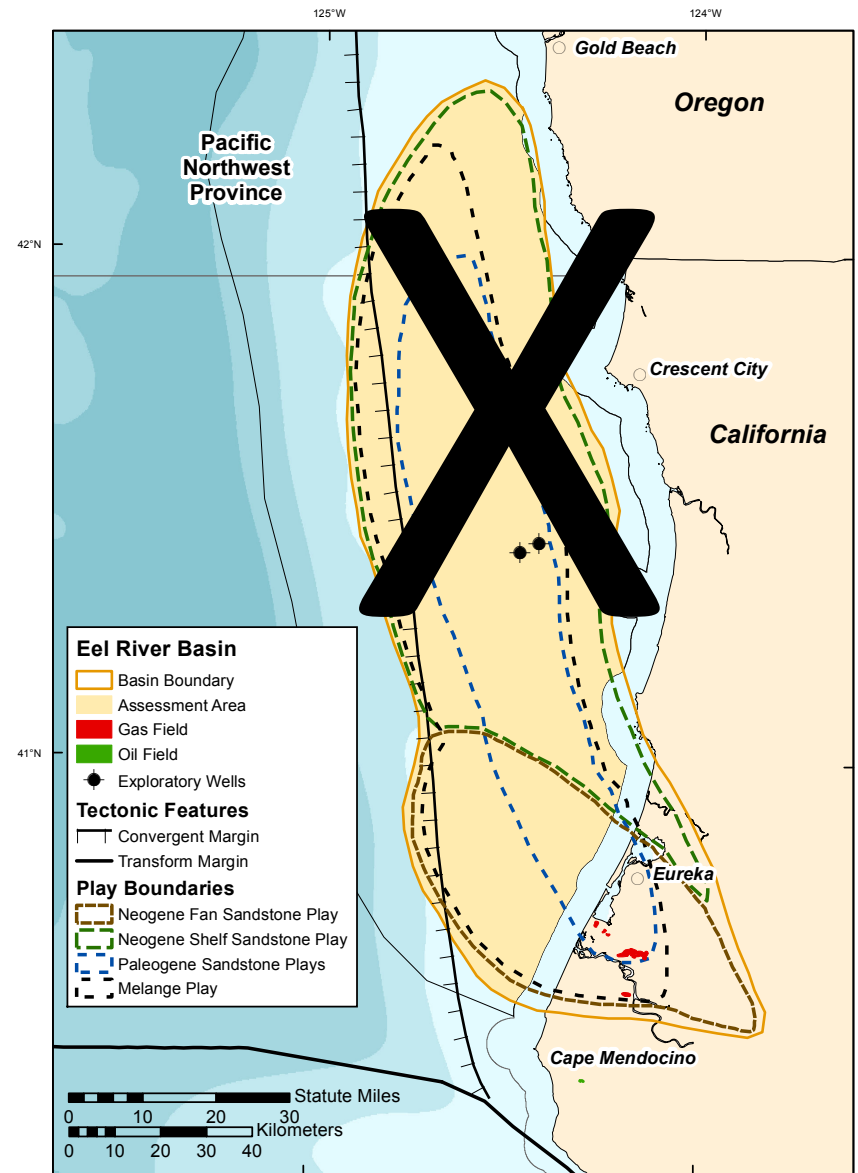


Eel River basin?

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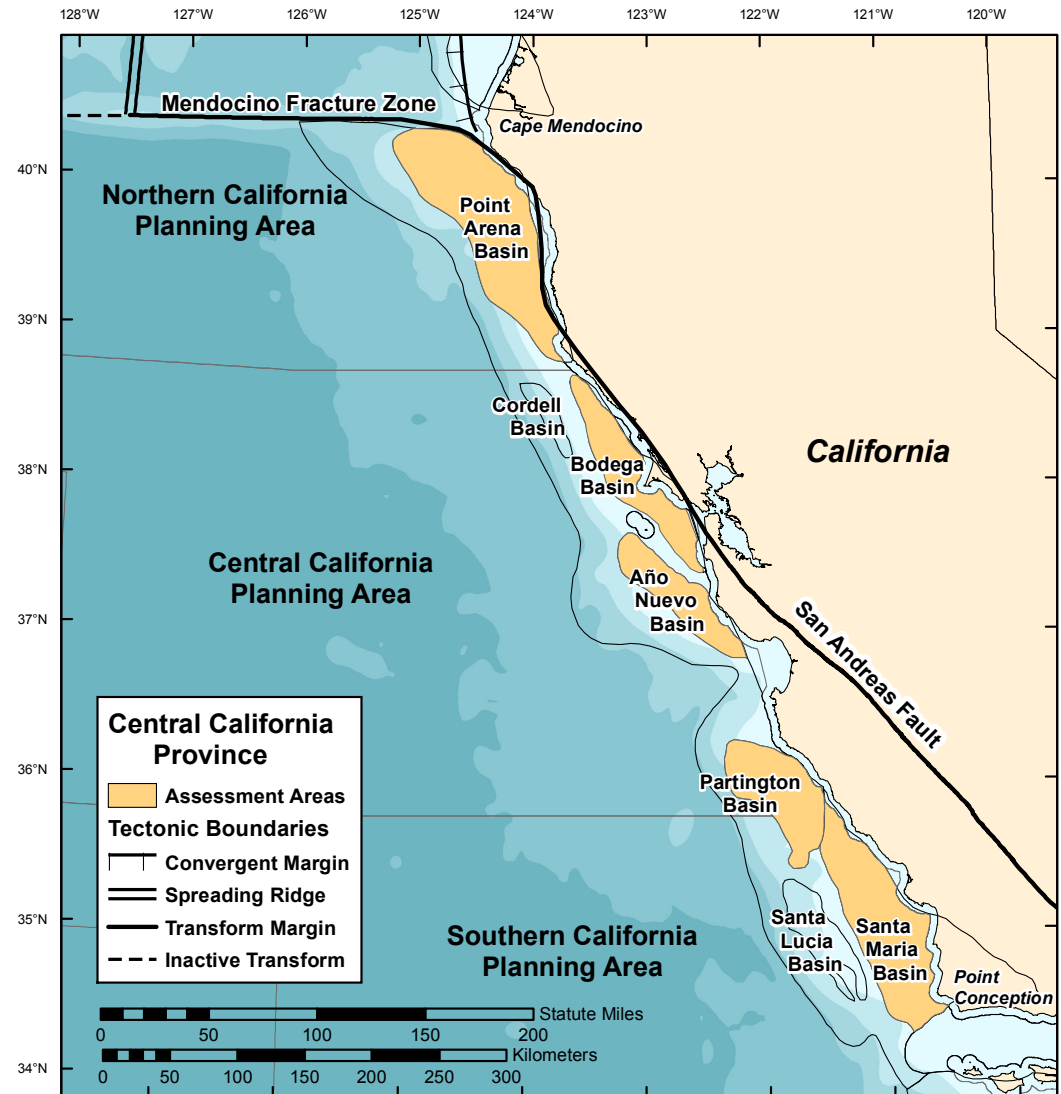


Central California?

Central California Province includes 5 basins considered to be prospective for conventional oil and gas: Point Arena, Bodega, Año Nuevo, Partington, and Santa Maria.

Central CA Planning Area, includes Bodega, Año Nuevo, and Partington basins.

- 29 leases issued in 1963
- 12 exploratory wells, 10 in Bodega, 2 in Año Nuevo.



Central California?

Mean estimates

Central CA Planning Area,
including Bodega, Año Nuevo, and
Partington basins:

Technically recoverable resources

- 2,401 million barrels of oil
- 2,493 billion cubic feet of natural gas

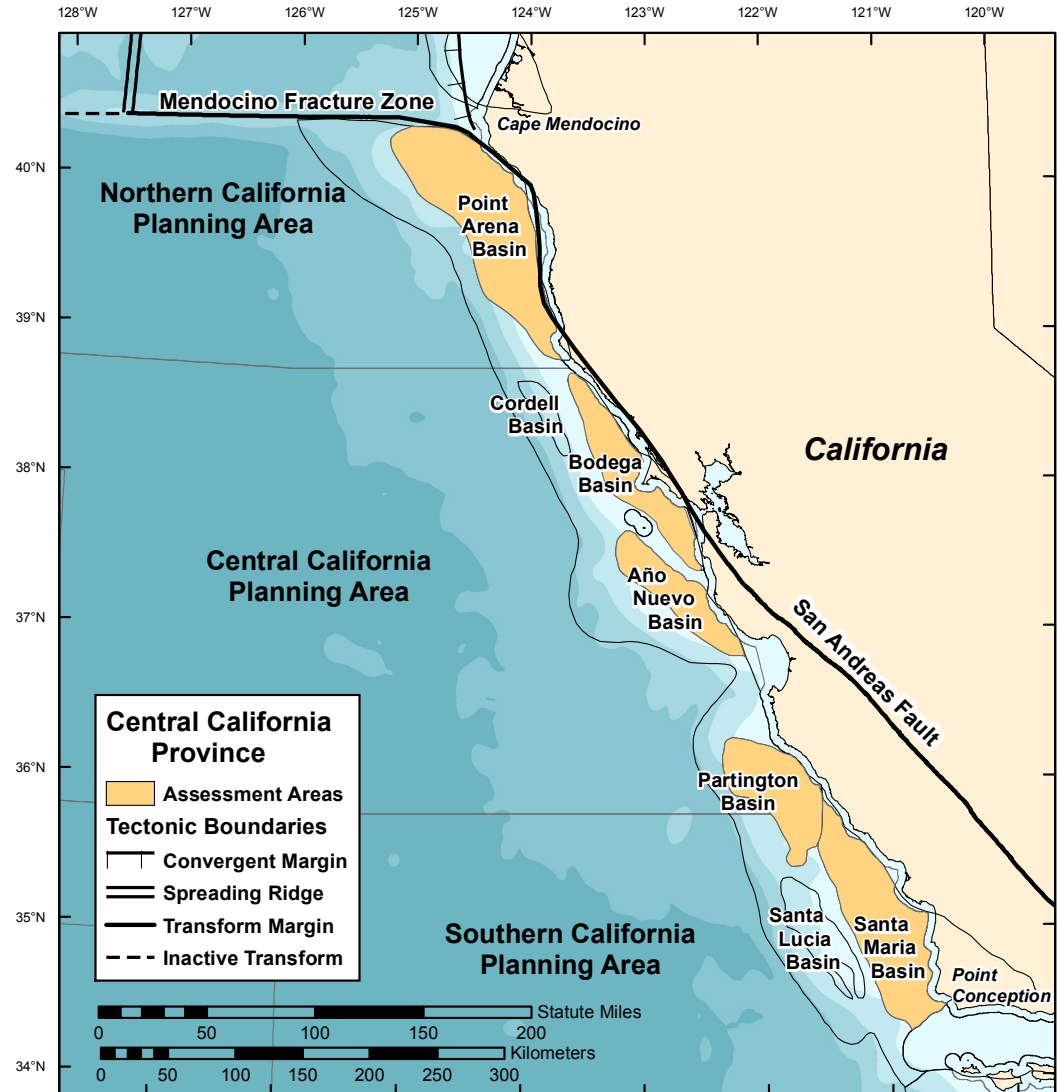
Economically recoverable

At \$90/bbl oil, and \$6.41/Mcf gas

- 2,103 million barrels of oil
- 2,196 billion cubic feet of natural gas

At \$60/bbl oil, and \$4.27/Mcf gas

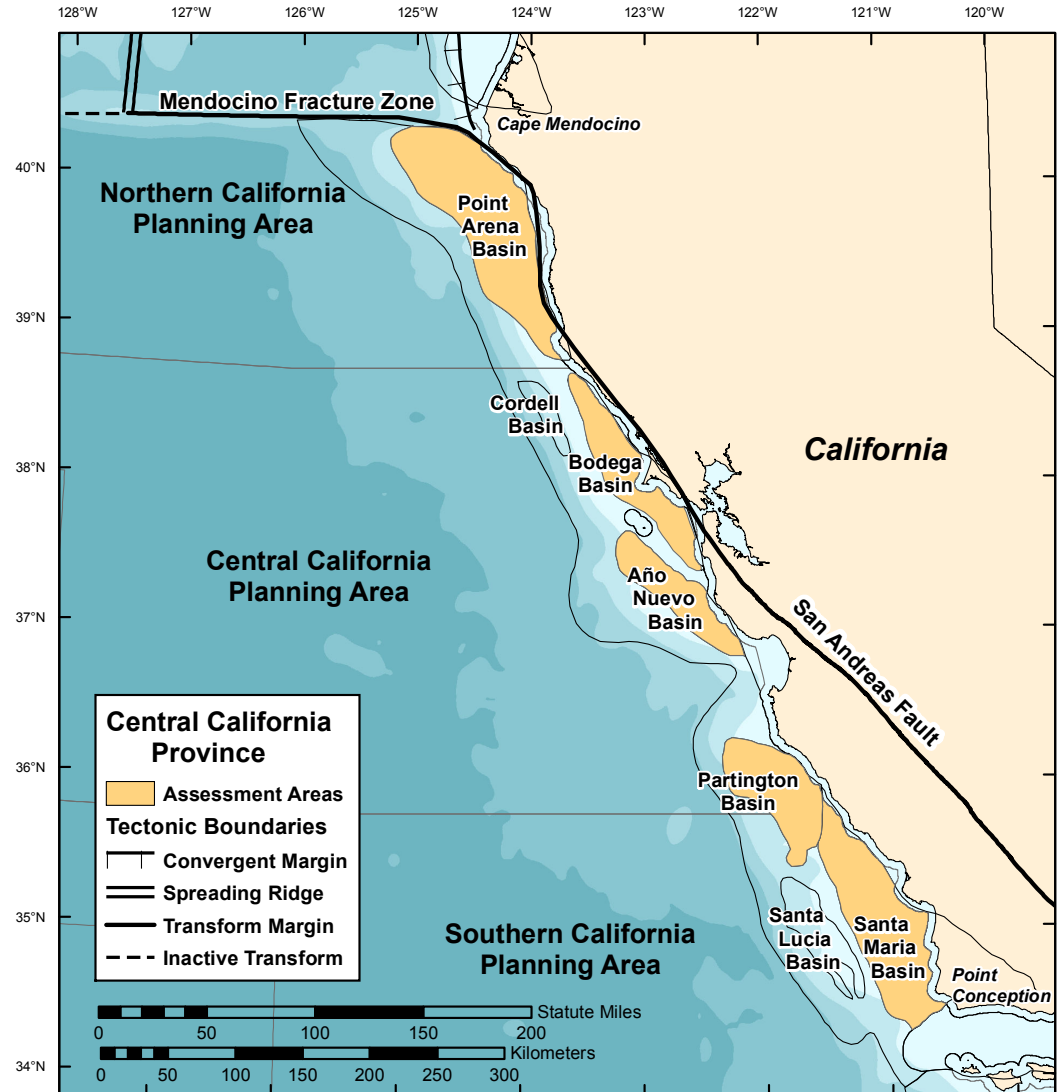
- 1,953 million barrels of oil
- 2,046 billion cubic feet of natural gas



Central California?

ECONOMIC AND POLITICAL FACTORS

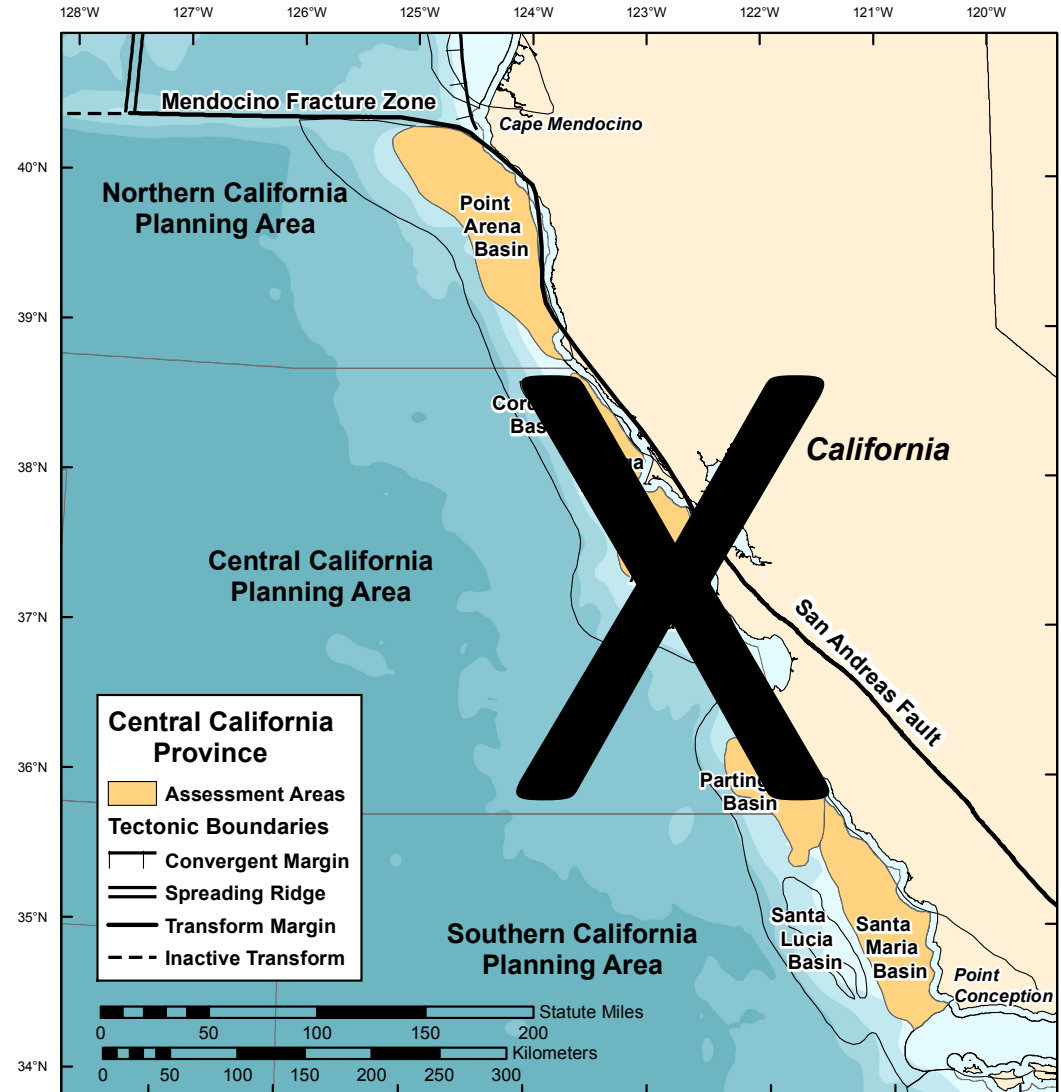
The Central basins (Bodega Año Nuevo and Partington) are almost completely closed to development by marine sanctuaries, and pending sanctuary expansions will close the remainder of these basins.



Central California?

ECONOMIC AND POLITICAL FACTORS

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Outer Borderlands Province?

Mean estimates

Technically recoverable resources

- 1,200 million barrels of oil
- 2,240 billion cubic feet of natural gas

Economically recoverable resources

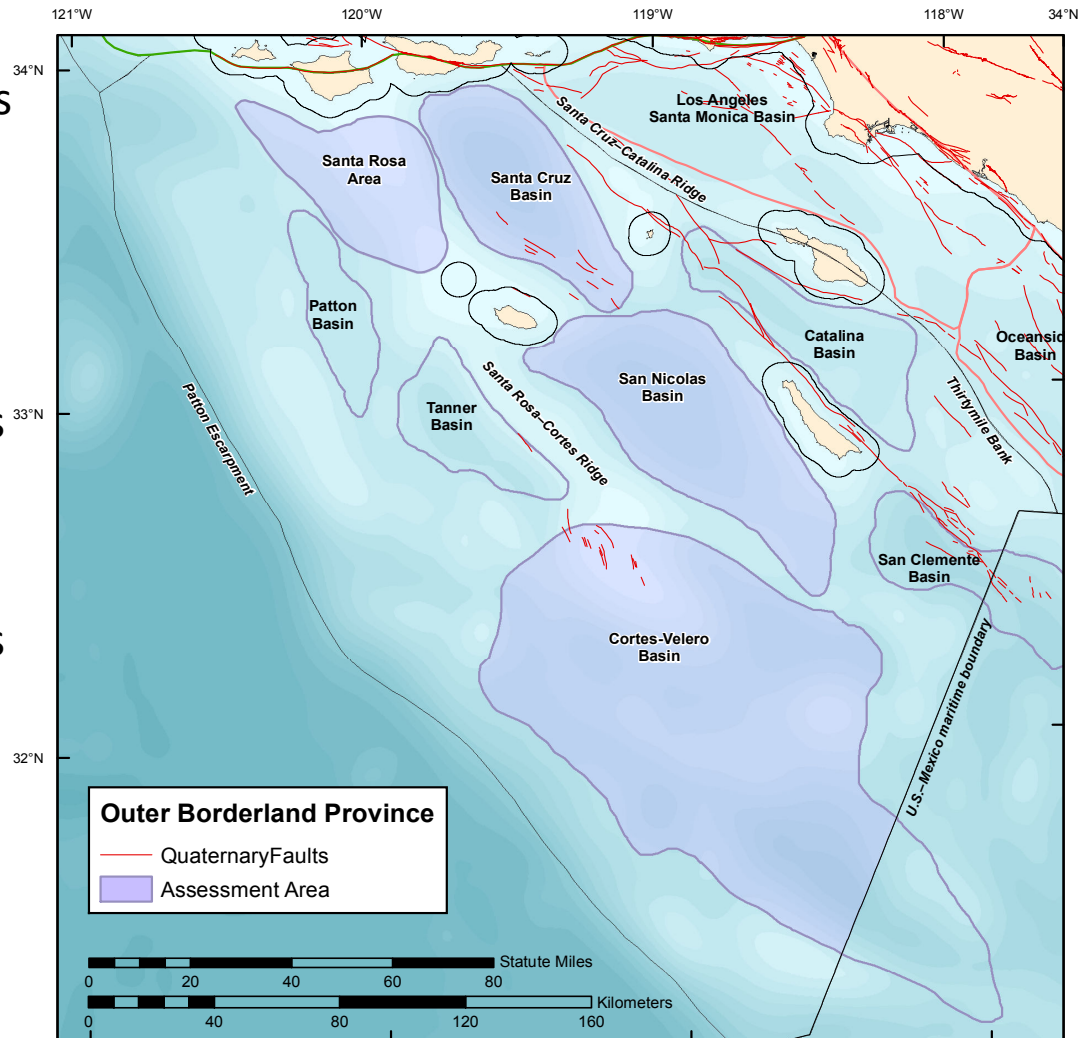
At \$90/bbl oil, and \$6.41/Mcf gas

- 310 million barrels of oil
- 570 billion cubic feet of natural gas

At \$60/bbl oil, and \$4.27/Mcf gas

- 230 million barrels of oil
- 440 billion cubic feet of natural gas

Each of the 3 assessed basins is expected to have no more than one field over 100 MMbbl. The basins total about 7,100 square miles.



Outer Borderlands Province?

Mean estimates

Technically recoverable resources

- 1,200 million barrels of oil
- 2,240 billion cubic feet of natural gas

Economically recoverable resources

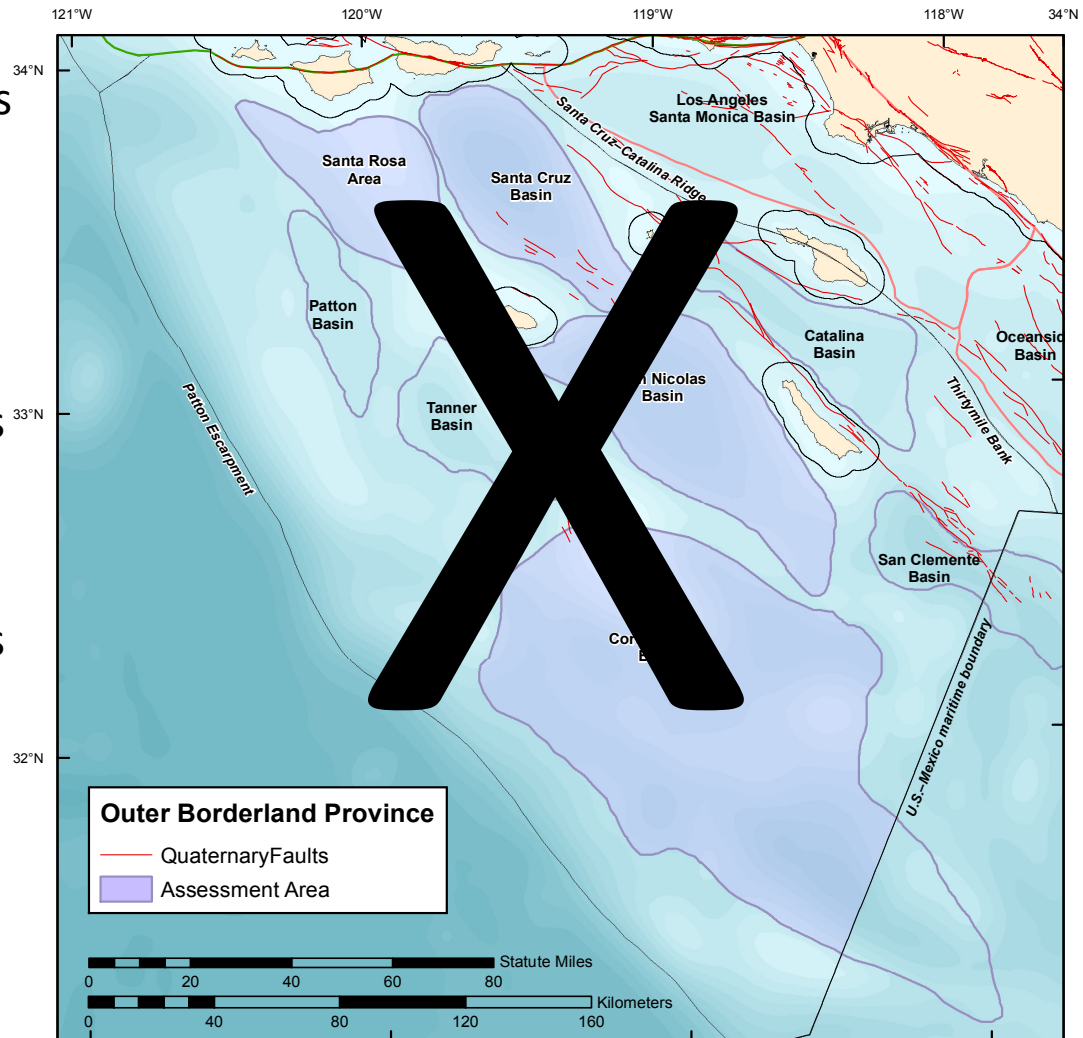
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So what's left?

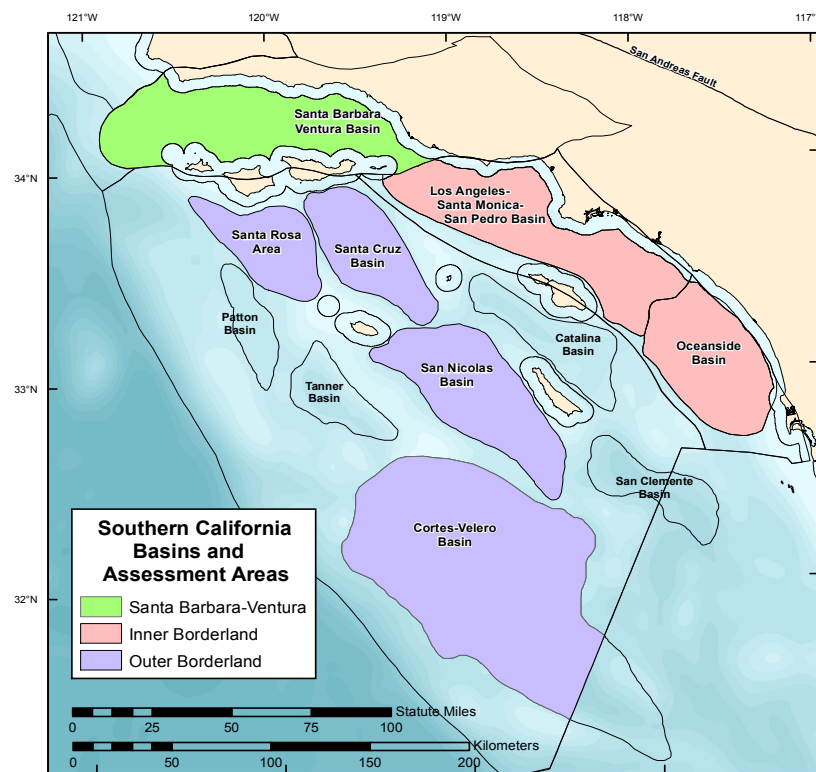
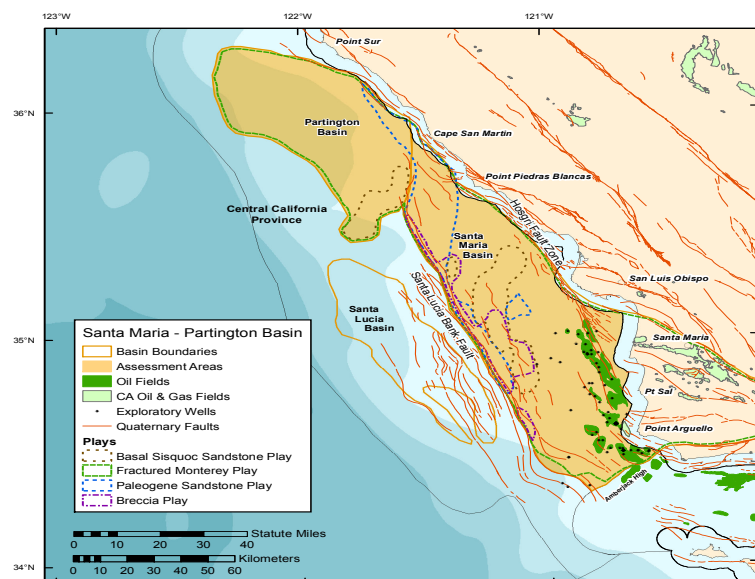
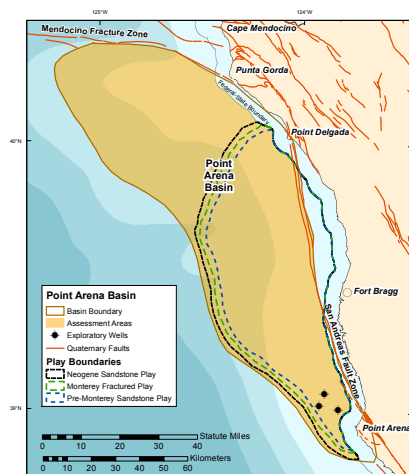
Point Arena

Santa Maria

Santa Barbara - Ventura

Los Angeles – Santa Monica – San Pedro

Oceanside



The numbers: Santa Barbara - Ventura

Mean estimates

Technically recoverable resources

- 1,341 million barrels of oil
- 2,744 billion cubic feet of natural gas

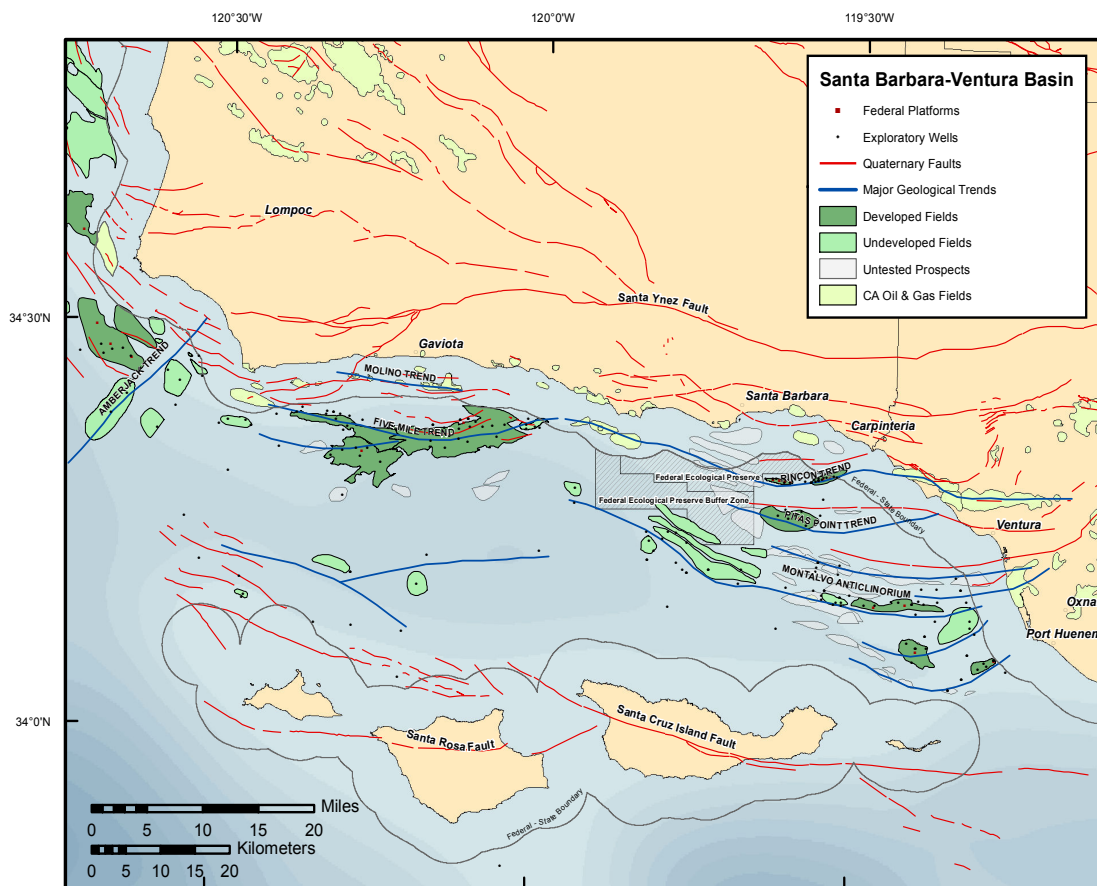
Economically recoverable resources

At \$90/bbl oil, and \$6.41/Mcf gas

- 1,246 million barrels of oil
- 2,371 billion cubic feet of natural gas

At \$60/bbl oil, and \$4.27/Mcf gas

- 1,190 million barrels of oil
- 2,233 billion cubic feet of natural gas



P.J. Lee, and P.C.C Wang

Lee, P.J., and Wang, P.C.C., 1984, PRIMES: A petroleum resources information management and evaluation system: Oil and Gas Journal, v. 82, no. 40, p. 204-206.

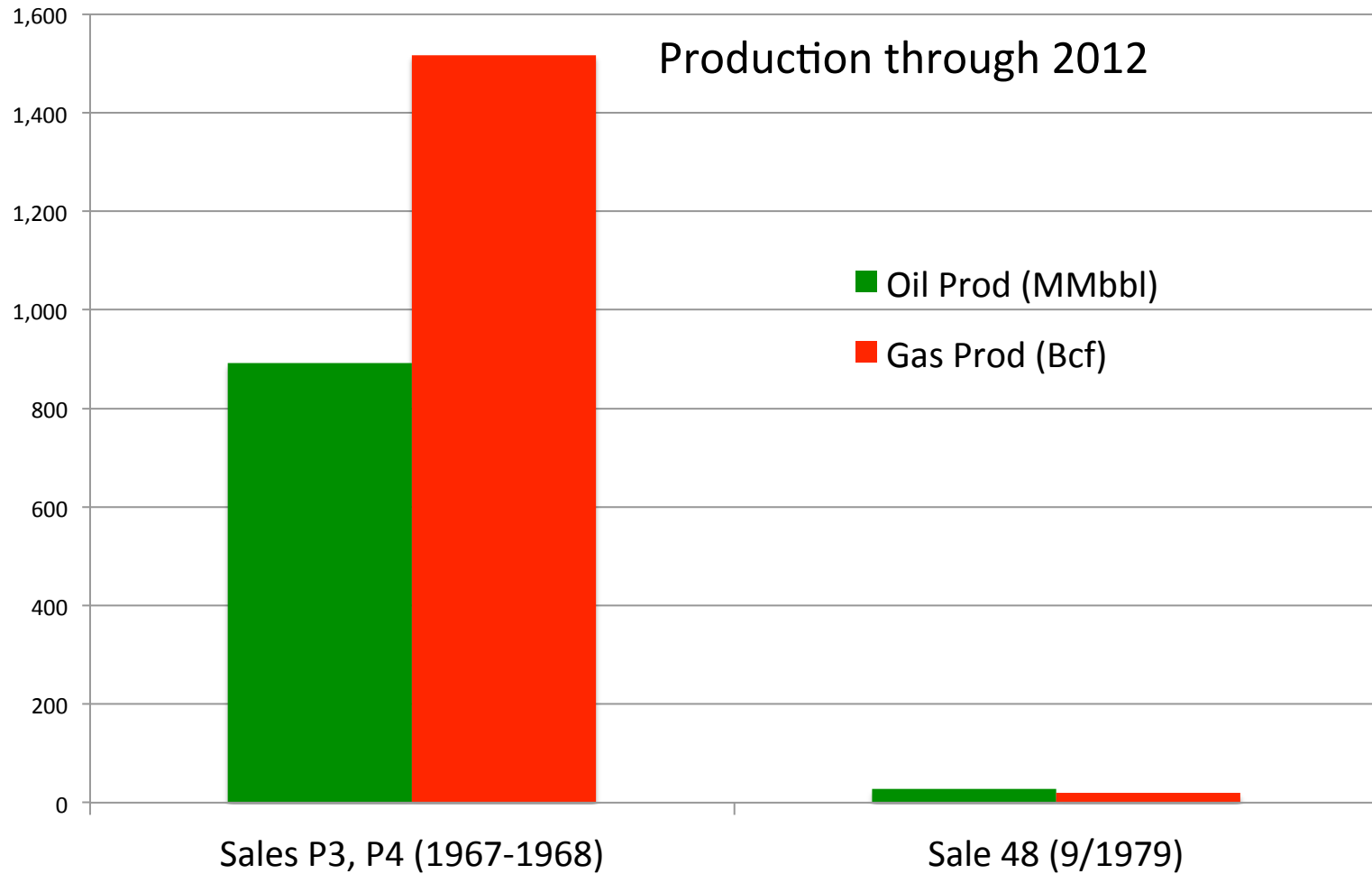
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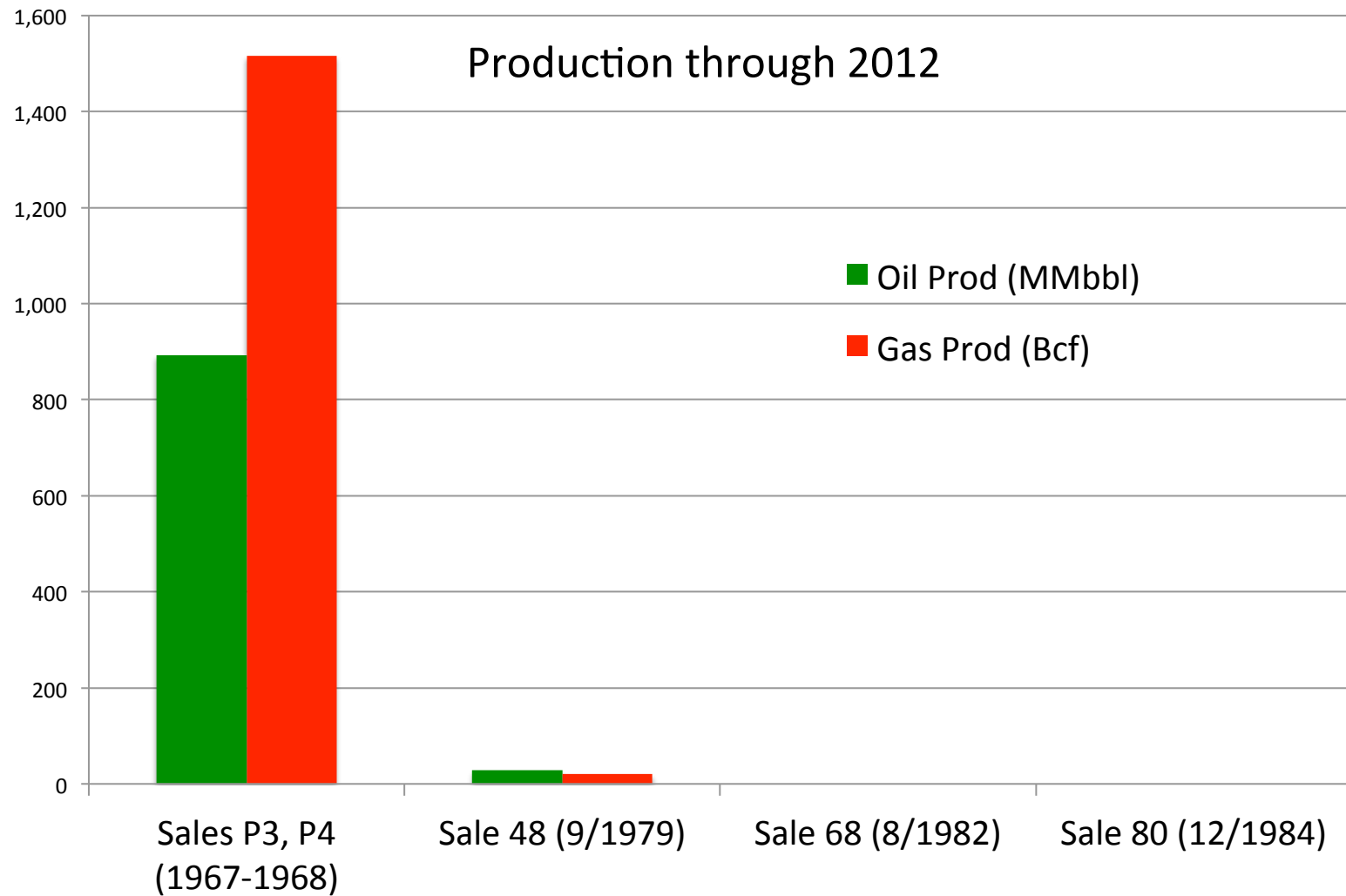
Accumulations of petroleum have a log-normal distribution within a geological basin or province.

The large accumulations are generally found first.

Santa Barbara – Ventura Basin



Santa Barbara – Ventura Basin



The numbers: Santa Maria – Partington

Mean estimates

Technically recoverable resources

- 1,109 million barrels of oil
- 843 billion cubic feet of natural gas

Economically recoverable resources

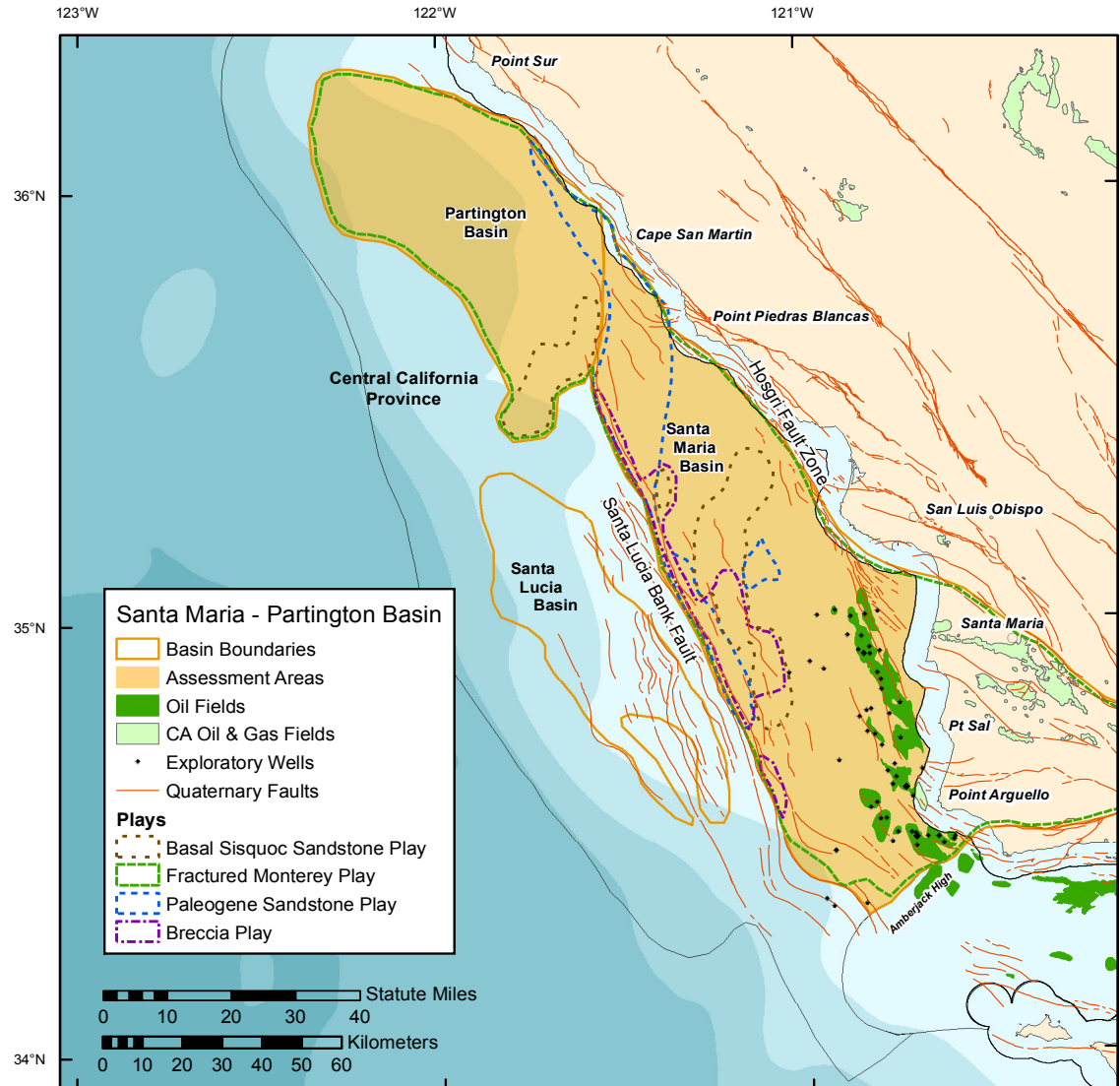
At \$90/bbl oil, and \$6.41/Mcf gas

- 812 million barrels of oil
- 611 billion cubic feet of natural gas

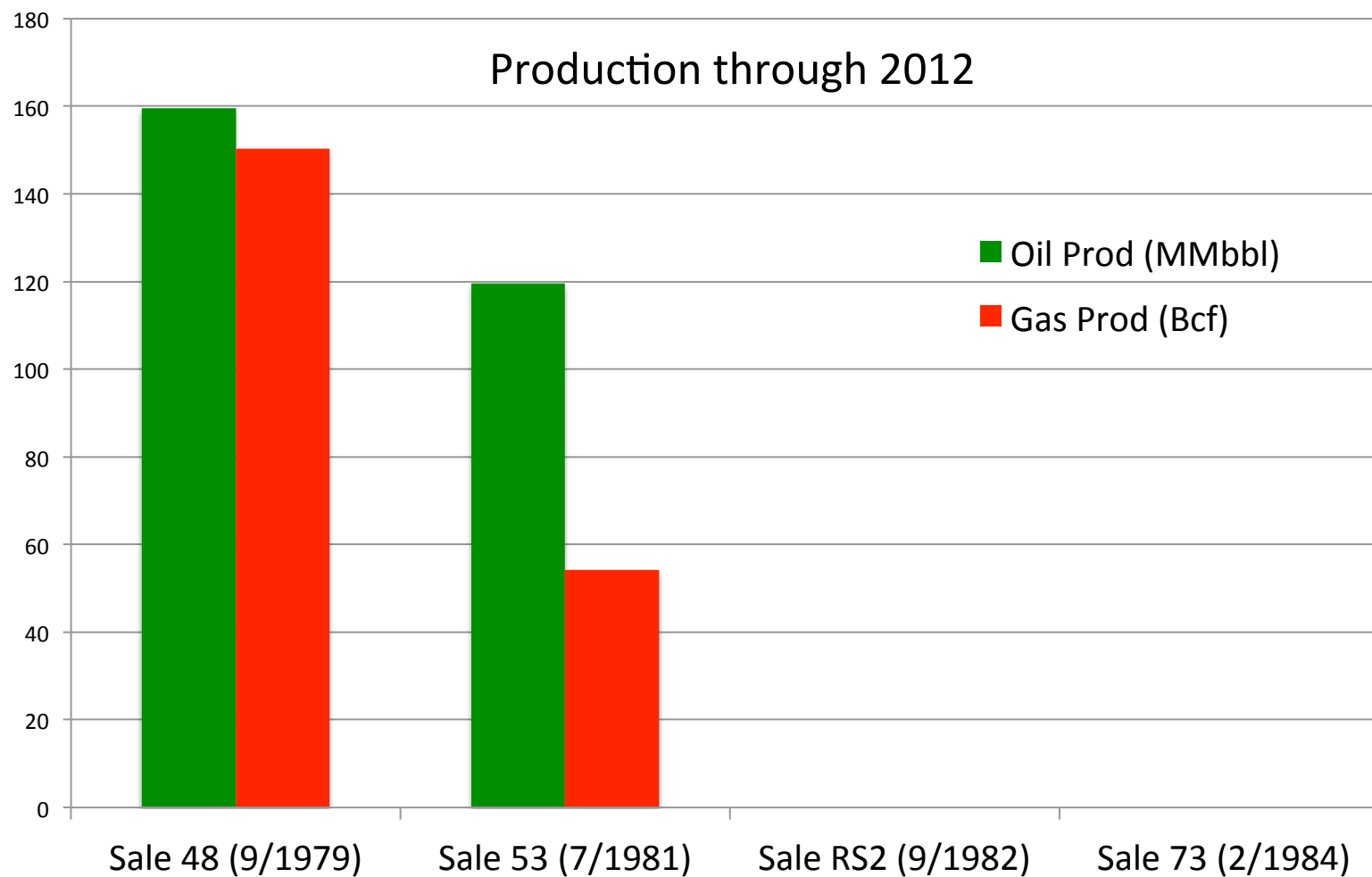
At \$60/bbl oil, and \$4.27/Mcf gas

- 678 million barrels of oil
- 510 billion cubic feet of natural gas

These resources are likely scattered about the basins in about a hundred accumulations.

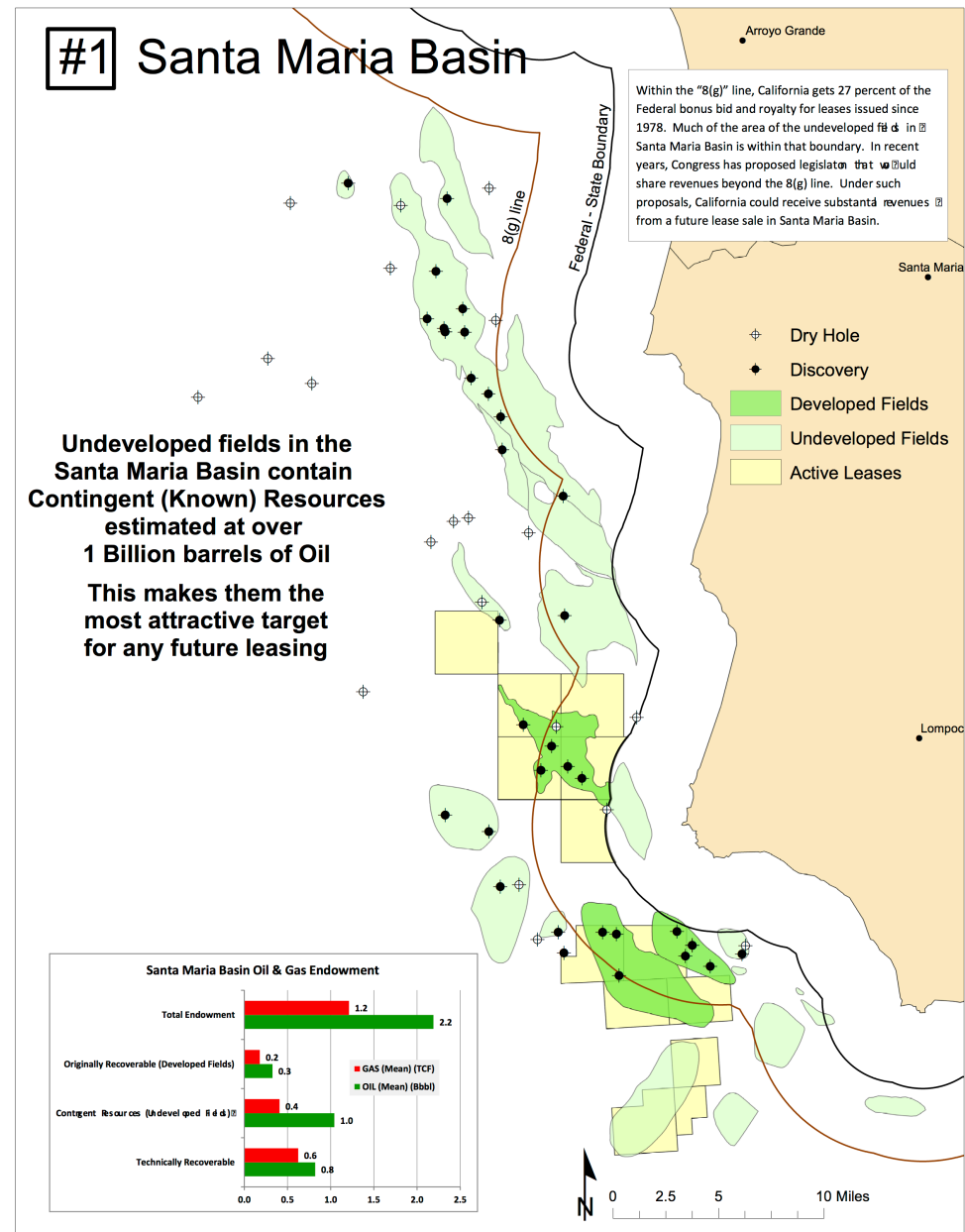


Santa Maria Basin



Santa Maria Basin

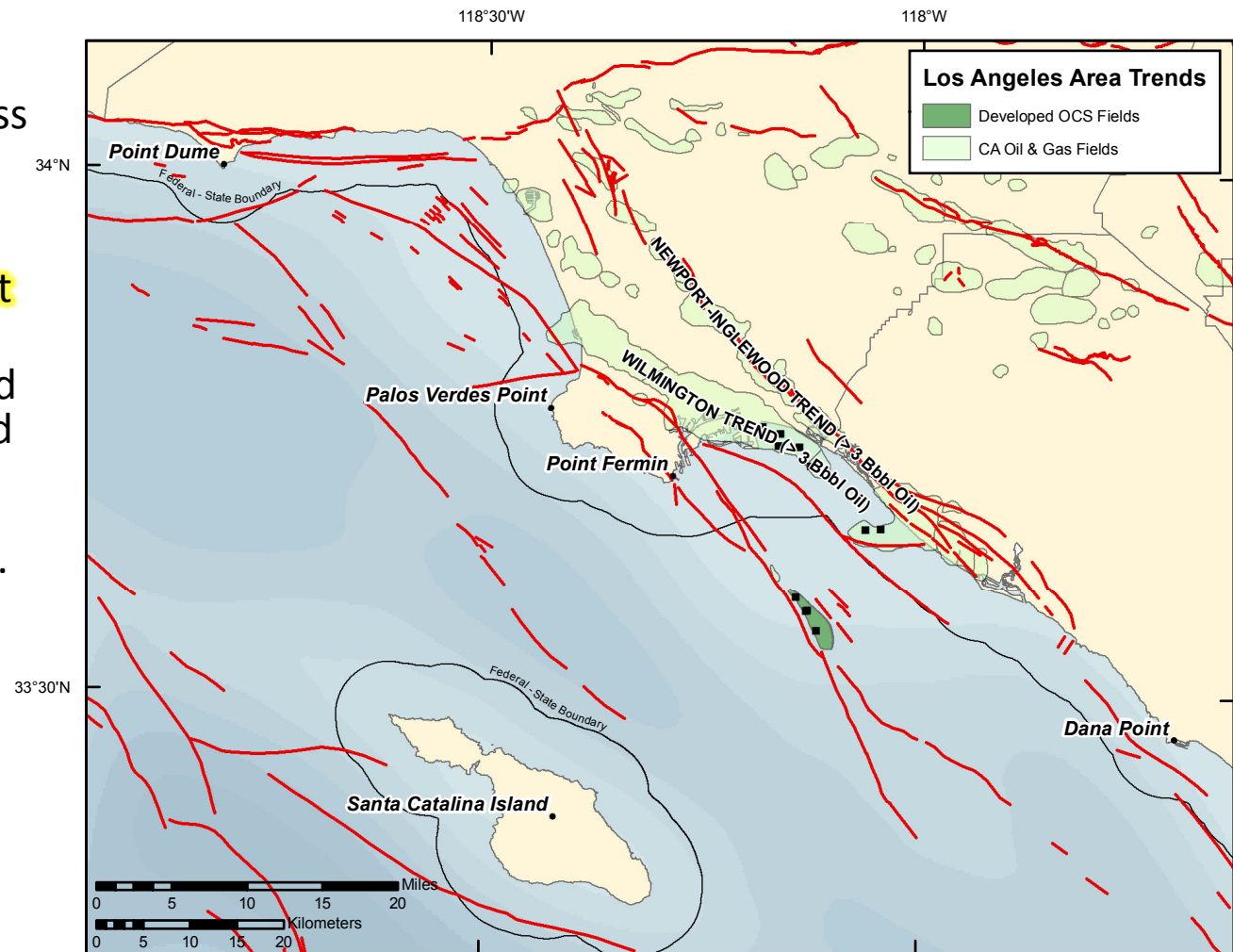
If Santa Maria basin is ever included in a future lease sale, all the interest will be on the leases that were bought back.



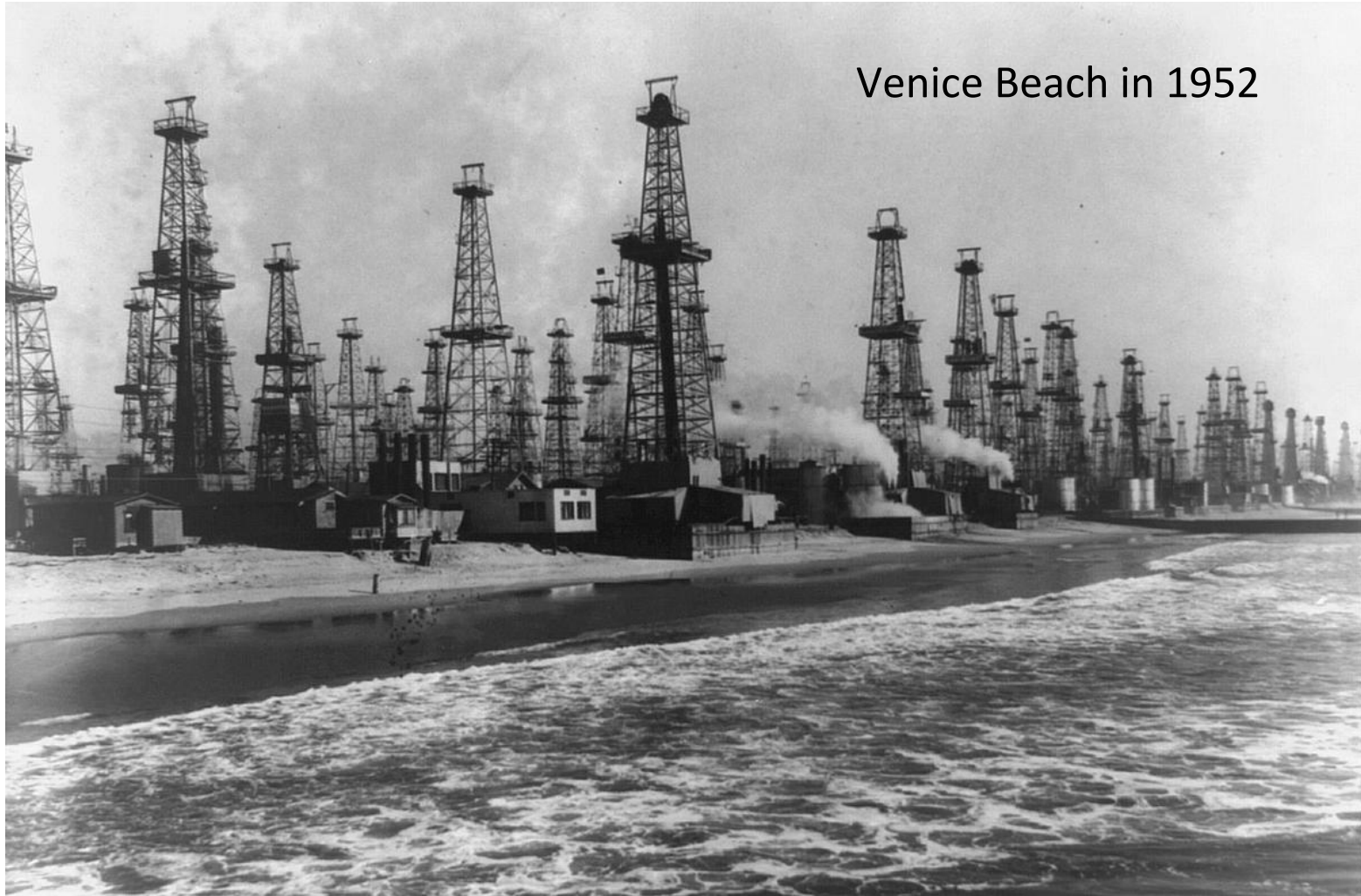
Los Angeles – Santa Monica – San Pedro

The Los Angeles basin is a world-class oil and gas basin; according to the USGS the “highest known oil/sediment ratio in the world.”

The Wilmington and Newport-Inglewood trends have each produced over 3 billion barrels of oil.



Los Angeles – Santa Monica – San Pedro



The numbers:

Los Angeles – Santa Monica – San Pedro

Mean estimates

Technically recoverable resources

- 894 million barrels of oil
- 1,030 billion cubic feet of natural gas

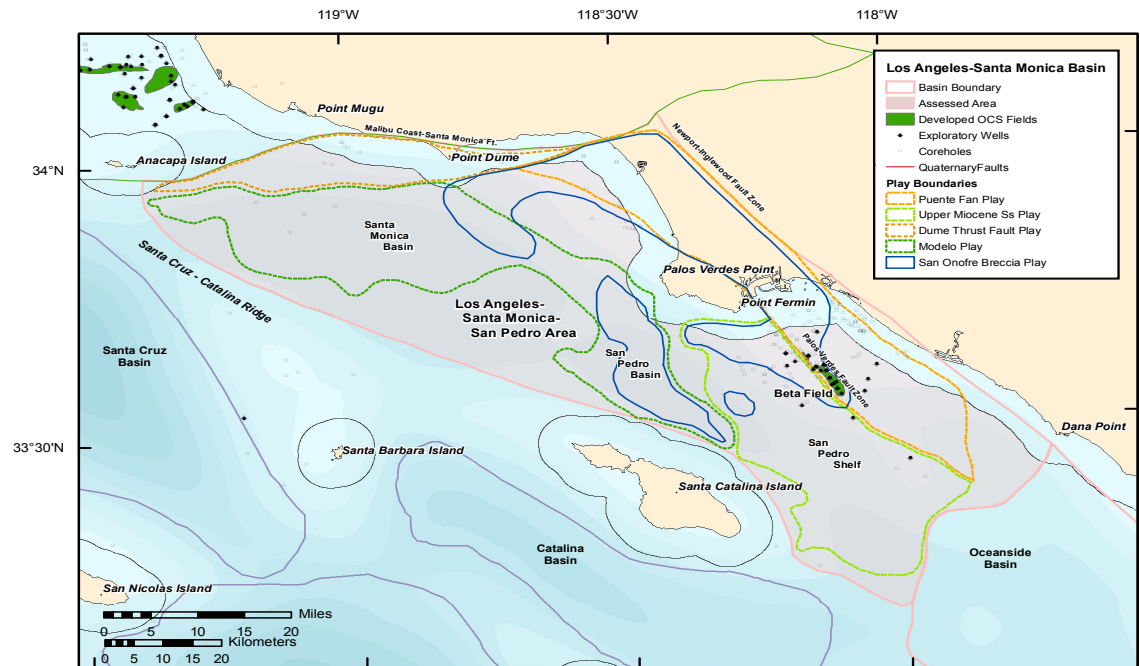
Economically recoverable resources

At \$90/bbl oil, and \$6.41/Mcf gas

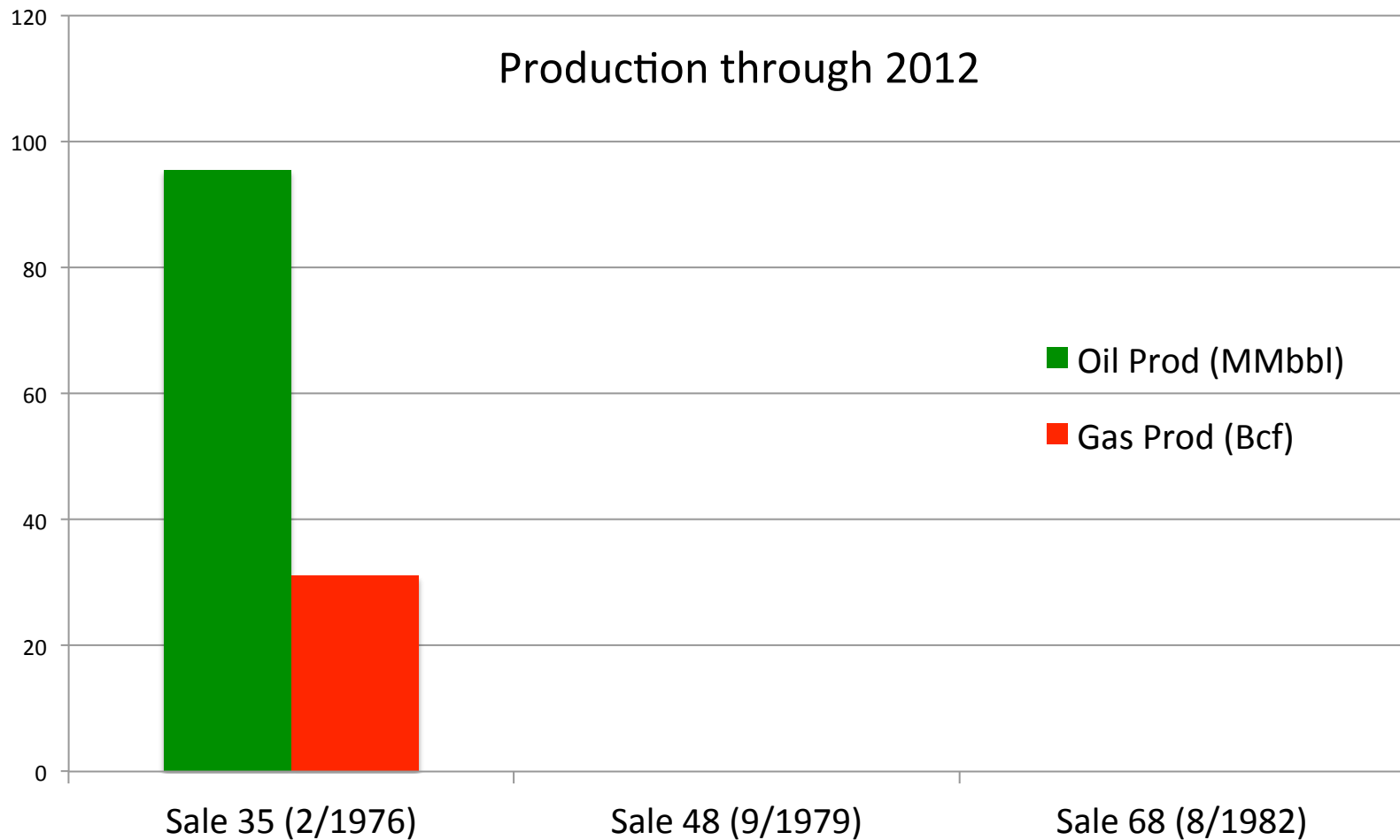
- 685 million barrels of oil
- 825 billion cubic feet of natural gas

At \$60/bbl oil, and \$4.27/Mcf gas

- 610 million barrels of oil
- 745 billion cubic feet of natural gas



Los Angeles – Santa Monica – San Pedro



What's the last best hope?

The last best hope

So, if not Santa Maria, Santa Barbara, Los Angeles-Santa Monica-San Pedro, then –

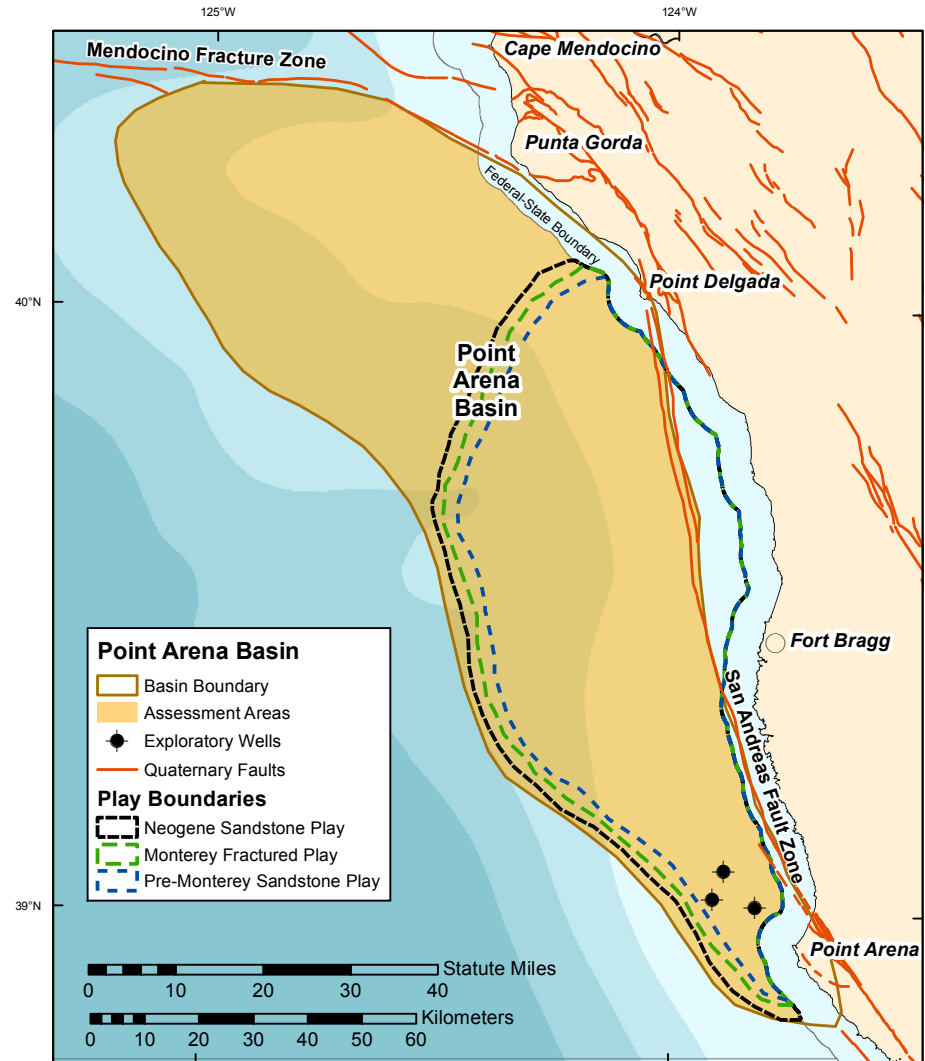
Point Arena (estimated 2 Bbbl technically recoverable)?

or

Oceanside (estimated 1 Bbbl technically recoverable oil)?

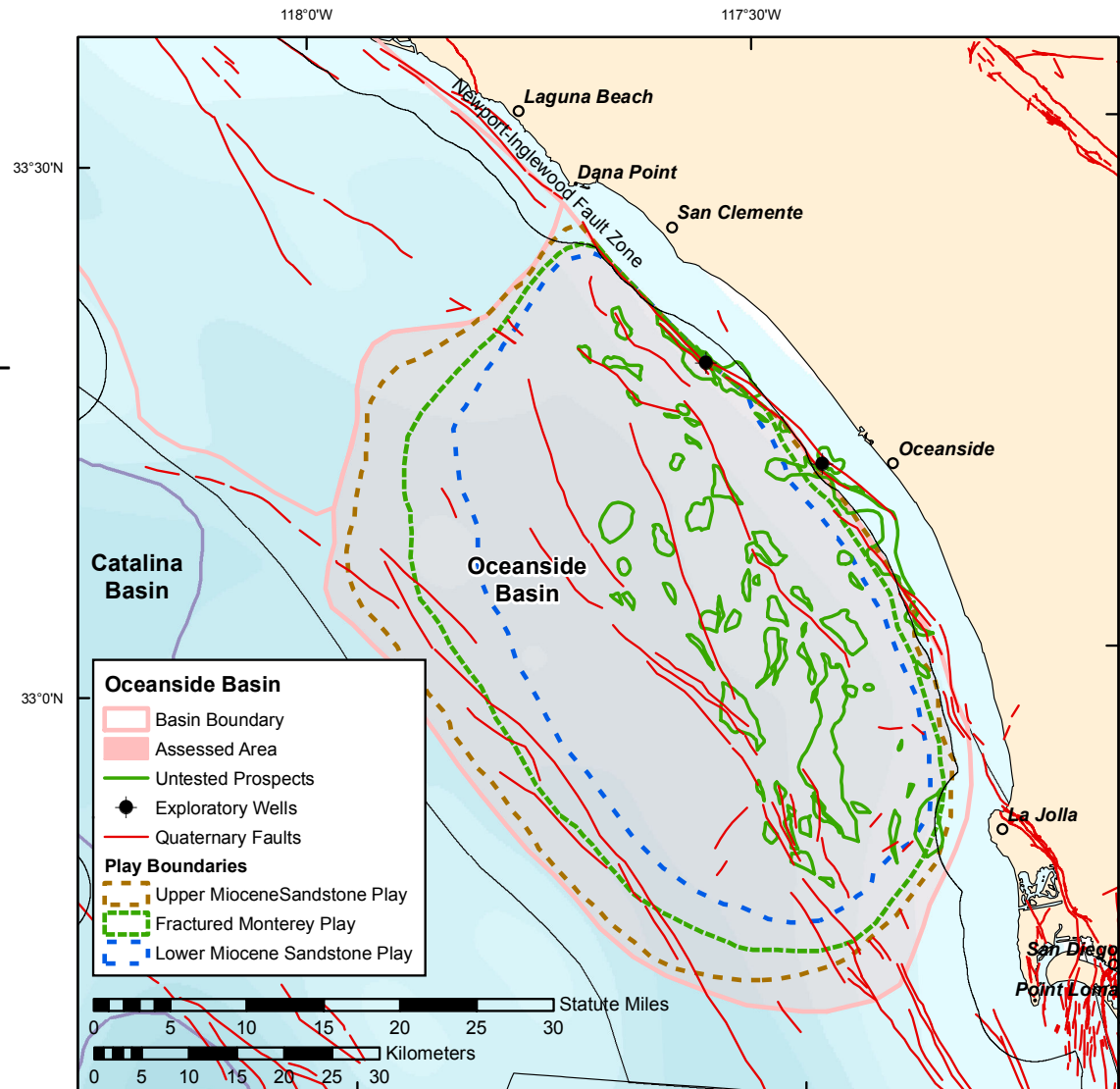
Point Arena Basin

- 6 leases issued in 1963.
- 3 exploratory wells in the southernmost part.
- Basin is about 3,000 square miles area; assessed play area is about 1,800 square miles. Water depth ranges from 200 feet at the three-mile line to about 5,000 feet at the western margin.



or Oceanside Basin?

- 2 exploratory wells from old state leasing. No data available for the wells.
- About 1,500 square miles area. Water depth ranges from 300 feet at the three-mile line to about 3000 feet.



The numbers: Point Arena Basin

Mean estimates

Point Arena Basin

Technically recoverable resources

- 2,009 million barrels of oil
- 2,097 billion cubic feet of natural gas

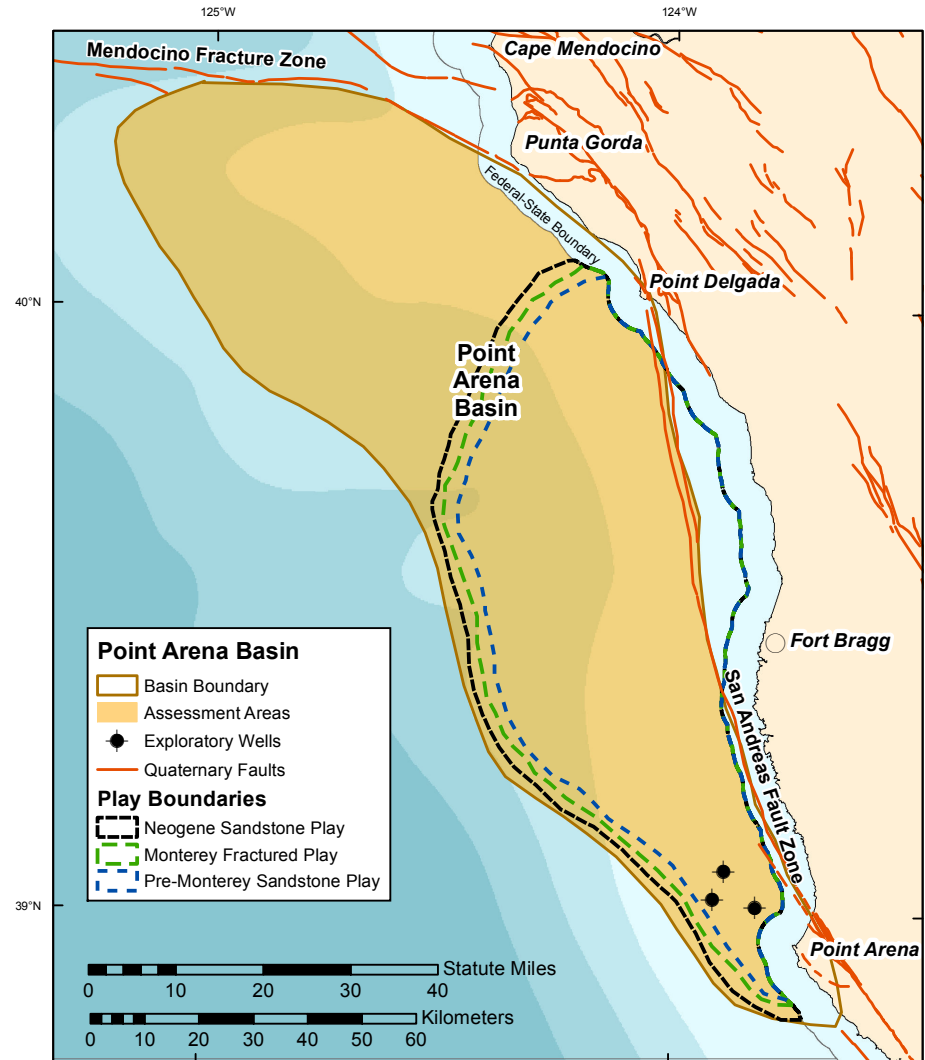
Economically recoverable resources

At \$90/bbl oil, and \$6.41/Mcf gas

- 1,333 million barrels of oil
- 1,382 billion cubic feet of natural gas

At \$60/bbl oil, and \$4.27/Mcf gas

- 1,152 million barrels of oil
- 1,195 billion cubic feet of natural gas



The numbers: Oceanside Basin

Mean estimates

Technically recoverable resources

- 1,062 million barrels of oil
- 1,120 billion cubic feet of gas

Economically recoverable resources

At \$90/bbl oil, and \$6.41/Mcf gas

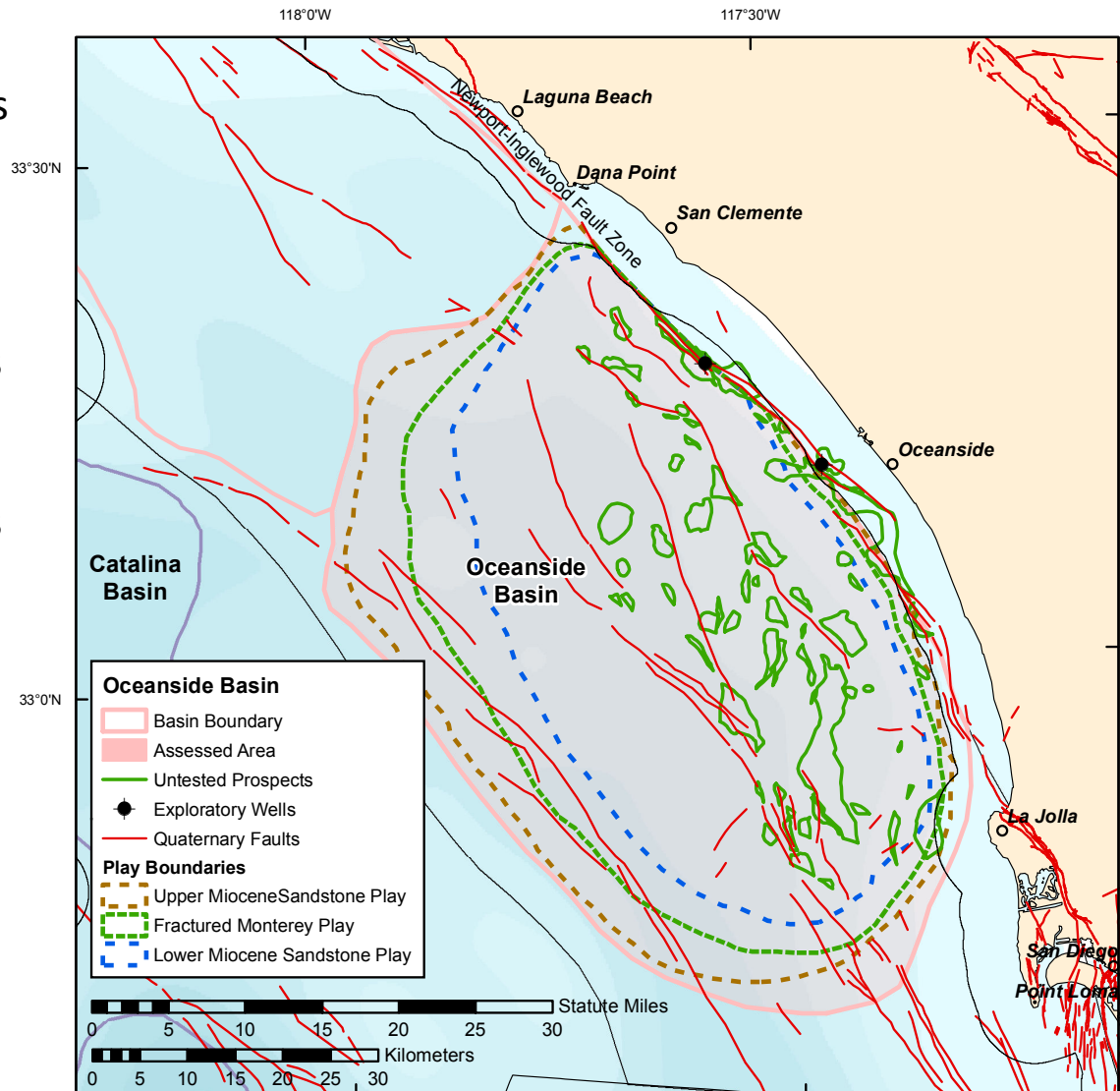
- 876 million barrels of oil
- 929 billion cubic feet of gas

At \$60/bbl oil, and \$4.27/Mcf gas

- 795 million barrels of oil
- 850 billion cubic feet of gas

These estimates include geologic risk (possibility that the assessed plays will not be successful). If exploration drilling proves the existence of the plays, the estimates will increase.

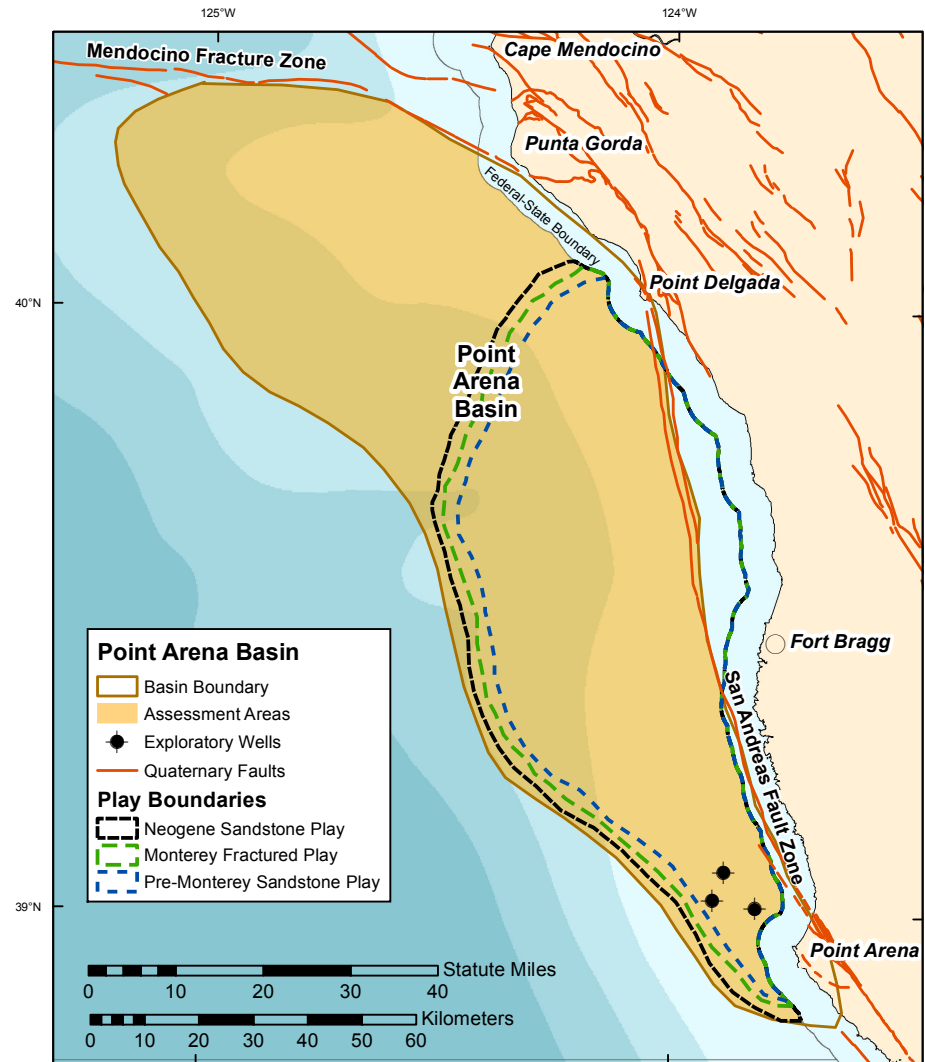
No information available from the 2 test wells.



Point Arena Basin?

ECONOMIC AND POLITICAL FACTORS

There is little oil and gas infrastructure on the coastline north of the San Francisco Bay, and no large coastal cities. Should there be any future development, pipelines could be shared among multiple platforms or subsea completions and tied to shore at either Eureka to the north or San Francisco Bay. In either of these cases there would be local opposition to development because of possible environmental impacts.



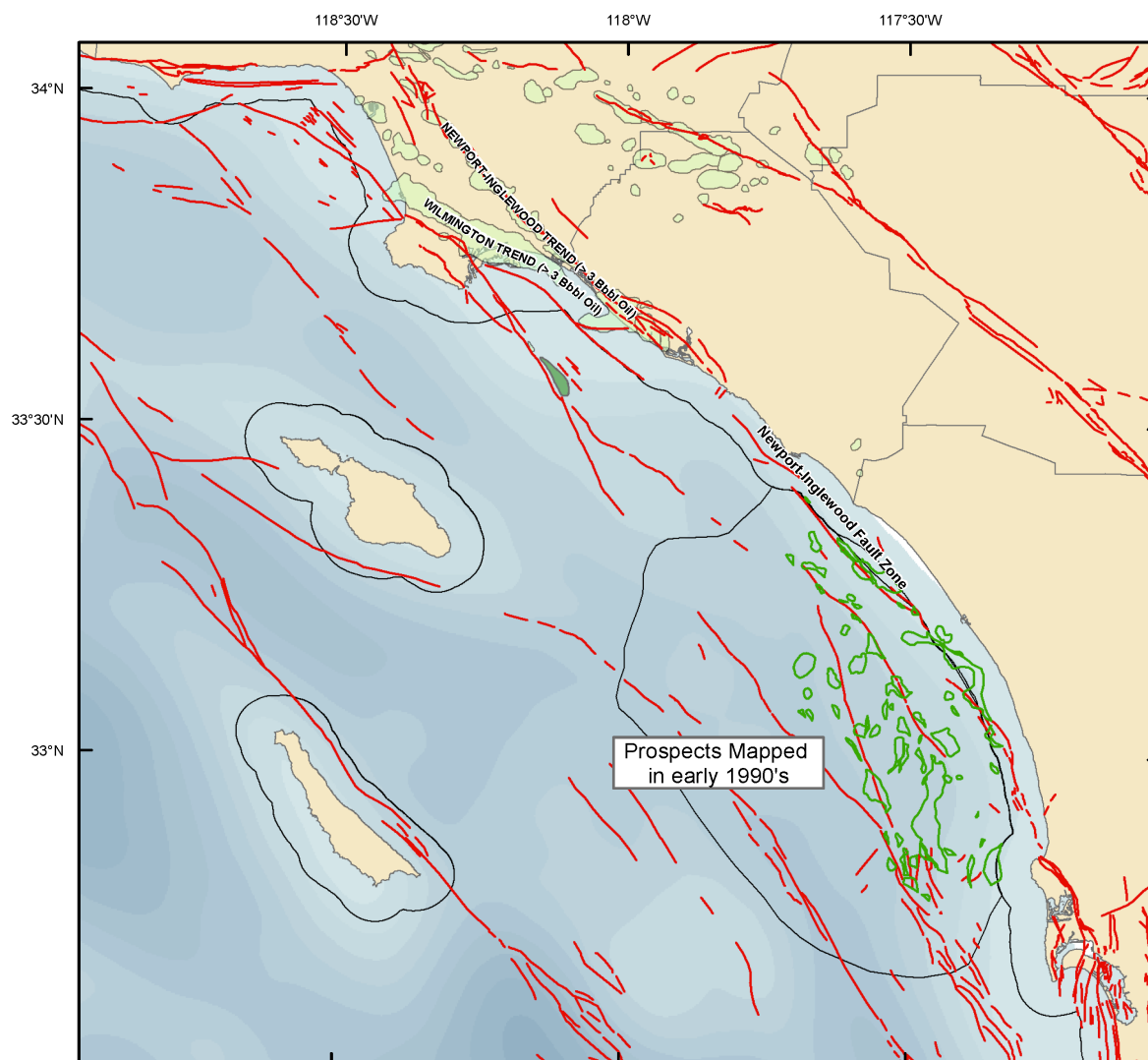
Oceanside Basin?

Mapped prospects on trend with multi-billion barrel trends to the north in the Los Angeles basin.

ECONOMIC FACTORS

There are no developed fields in the Oceanside basin; however there are multiple viable coastal access points. Any future development would likely be required to tie share pipelines and other facilities. The number of platforms could be minimized by the use of extended-reach drilling.

There would be much local opposition to any development off this stretch of the California coast.



Last best hope?

The Los Angeles basin has been the most prolific basin in the world on a per cubic mile basis. The two trends that merge into the Newport-Inglewood-Capistrano fault zone each have in excess of 3 billion barrels of oil. There are lots of big mapped prospects, and we don't know what the 2 wells showed. If it wasn't for the West Coast politics, this would be the basin of choice. However...

North San Diego County has increased greatly in population in the last 30 years and there would likely be much local opposition to any development. That opposition would include Camp Pendleton Marine Base that uses the offshore area for military maneuvers.

Why spend the money?

I know of no member of Congress from the Pacific Coastal area that is in favor of offshore development.

All 3 States have expressed opposition to further development, although California is in desperate need of money.

No presidential administration since Reagan has supported development off the West Coast.

The Department of the Interior goes through the motions, but never recommends the Pacific for leasing in its 5-year plans.

Oil and gas companies have lost interest, having been burned by lawsuits and lack of support by government or the public.

For more information

For a copy of this presentation, contact Ken at:

kp@kineticpotentialenergy.com

More on both conventional and alternative energy can be found at:

www.kineticpotentialenergy.com

2011 National Assessment of Oil and Gas Resources
Assessment of the Pacific Outer Continental Shelf Region
(abridged version) can be found at:

[www.boem.gov/Oil-and-Gas-Energy-Program/Resource-Evaluation/
Resource-Assessment/RA-Pacific.aspx](http://www.boem.gov/Oil-and-Gas-Energy-Program/Resource-Evaluation/Resource-Assessment/RA-Pacific.aspx)