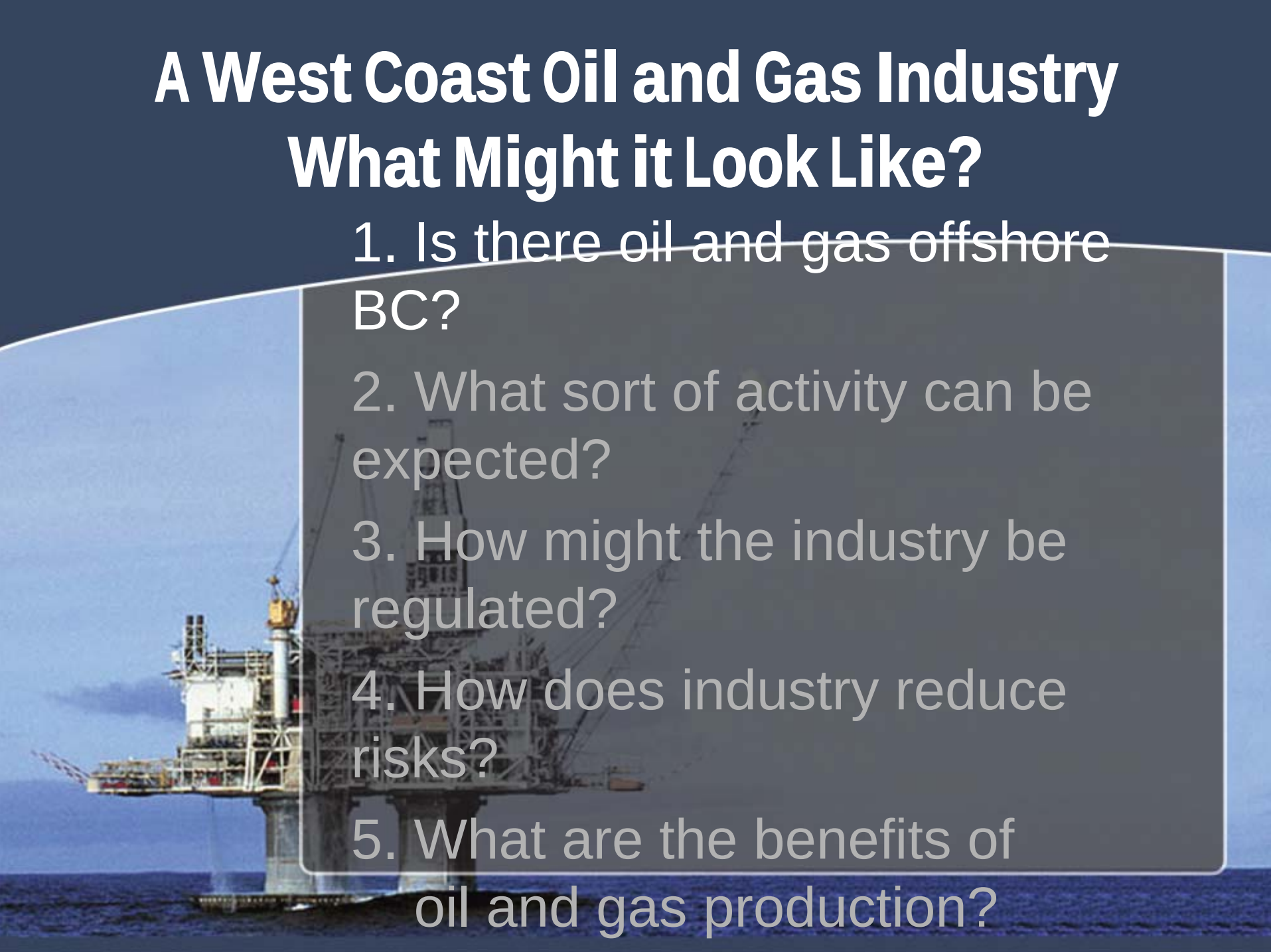
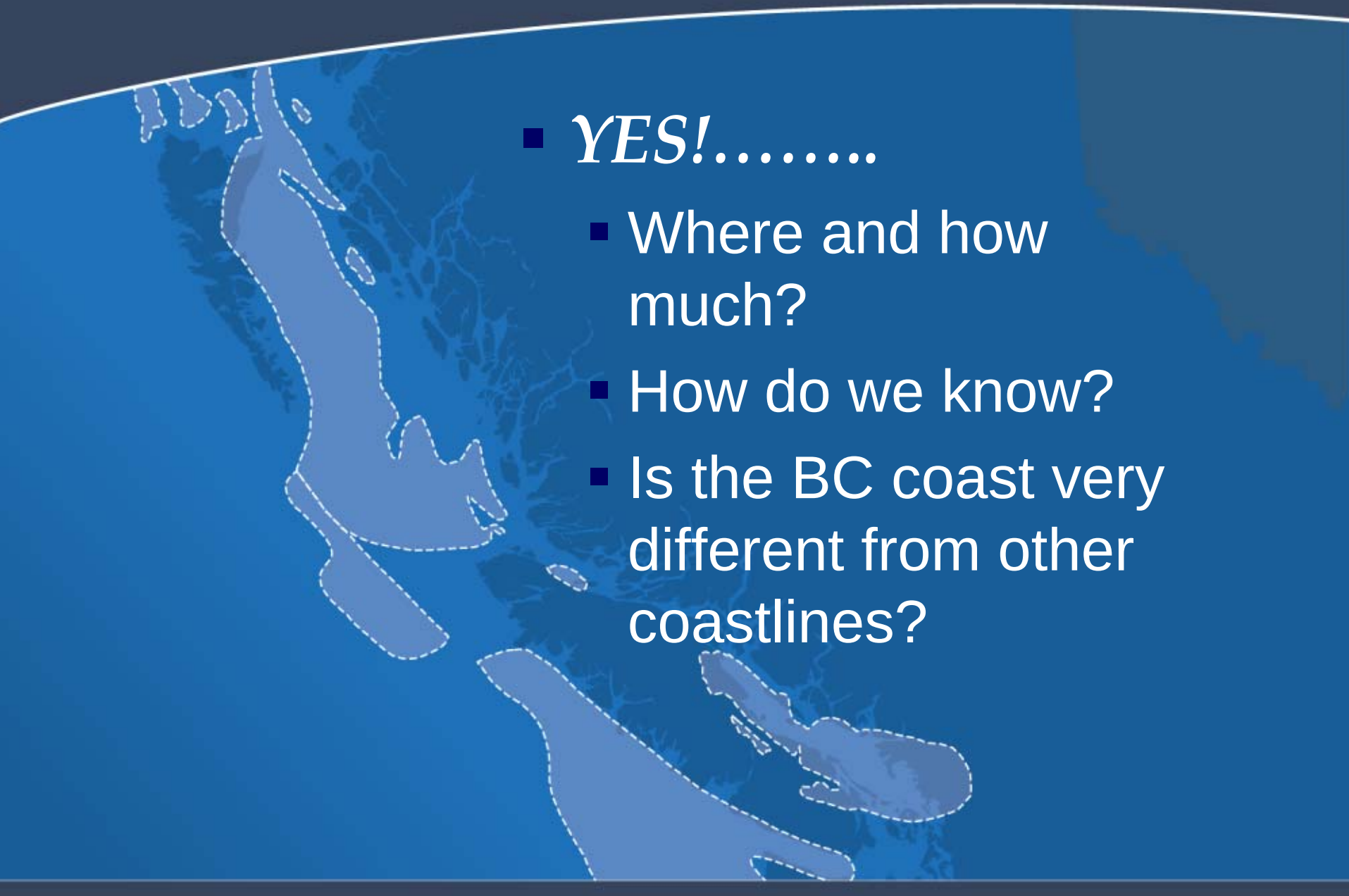
A West Coast Oil and Gas Industry What Might it Look Like?



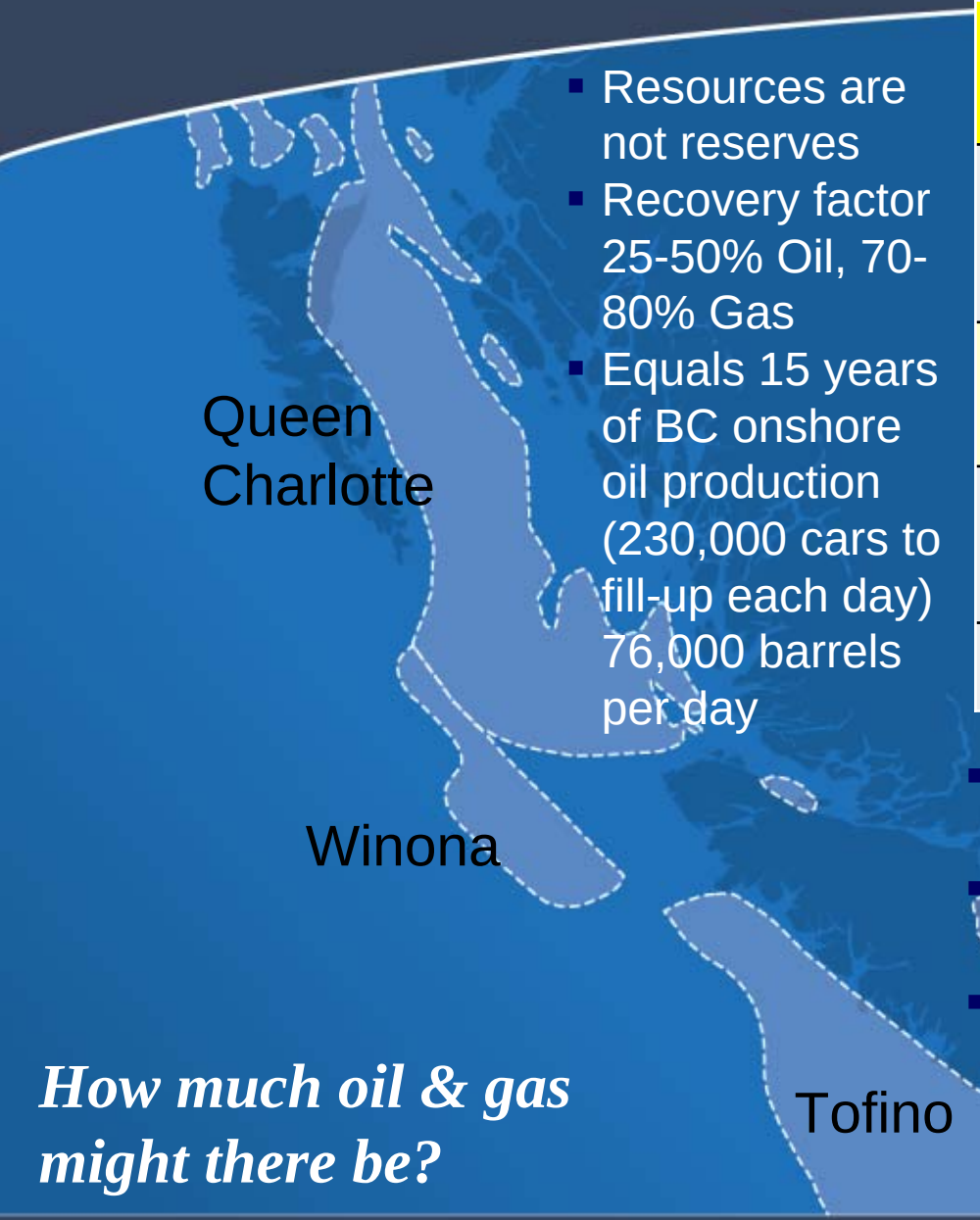
1. Is there oil and gas offshore BC?
2. What sort of activity can be expected?
3. How might the industry be regulated?
4. How does industry reduce risks?
5. What are the benefits of oil and gas production?

Is There Oil & Gas Offshore BC?



- *YES!……..*
  - Where and how much?
  - How do we know?
  - Is the BC coast very different from other coastlines?

Location and Potential of Basins



- Resources are not reserves
- Recovery factor 25-50% Oil, 70-80% Gas
- Equals 15 years of BC onshore oil production (230,000 cars to fill-up each day) 76,000 barrels per day

GSC Estimated In-Place Potential Resource		
Basin	Oil (Billion Barrels)	Gas (Trillions Cubic Ft)
Queen Charlotte	9.8	25.9
Tofino/ Winona	0	9.4
Georgia	0	6.5

- Equals 15 to 30 times BC onshore oil reserves
- QCB gas enough to supply BC for 16 years
- Enough gas offshore to heat all Canada's homes for 60 years

How much oil & gas might there be?

Exploration History

- Queen Charlotte Basin
  - Shell Canada completed several thousand km of seismic in 1965 to 1969
  - Chevron Canada completed additional seismic surveys in 1971
  - GSC completed 1000 km reflection survey in 1988
  - First exploration well drilled in 1913 on Graham Island with eight more wells drilled between 1949 and 1971 by various oil companies
  - Shell drilled eight more wells offshore, six in Hecate Strait and two in Queen Charlotte Sound between 1968 and 1969
  - Since federal moratorium of 1972 only one onshore well drilled on Graham Island in 1984 by Bow Valley Industries

Exploration History

- Georgia Basin
  - Richfield Oil Company, Conoco and BC Hydro (looking for potential underground gas storage) completed numerous seismic surveys onshore in Lower Mainland between in 1959 and 1977
  - More than 2700 km of offshore seismic survey work was conducted by various oil companies in the Strait of Georgia in the1960's
  - First exploration wells drilled onshore in Fraser Valley and Washington in early 1900's and since then 118 wells drilled for shallow oil and gas in this area.
  - A total of three wells were also drilled on Vancouver Island and one on Saturna Island between1959 and 1987

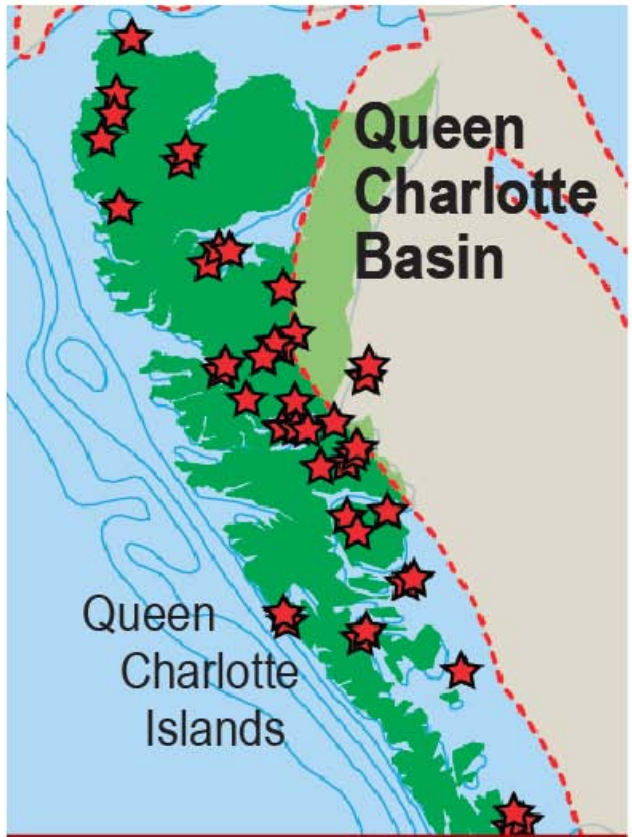
Exploration History

- Tofino Basin
  - Shell Canada competed aeromagnetic and seismic surveys offshore in the 1960's
  - Numerous other seismic surveys and other geophysical studies were conducted by Chevron, GSC, UBC throughout 1970's and 1980's
  - Shell Canada drilled six wells offshore in Tofino Basin and four onshore wells on the northern coast of the Olympia Peninsula in late 1960's

Indicators - Natural Oil Seeps

Active Natural Seep of Oil and Gas,
Oil Creek Alaska Peninsula

Active Natural Seep of Oil,
Oil Creek Alaska Peninsula

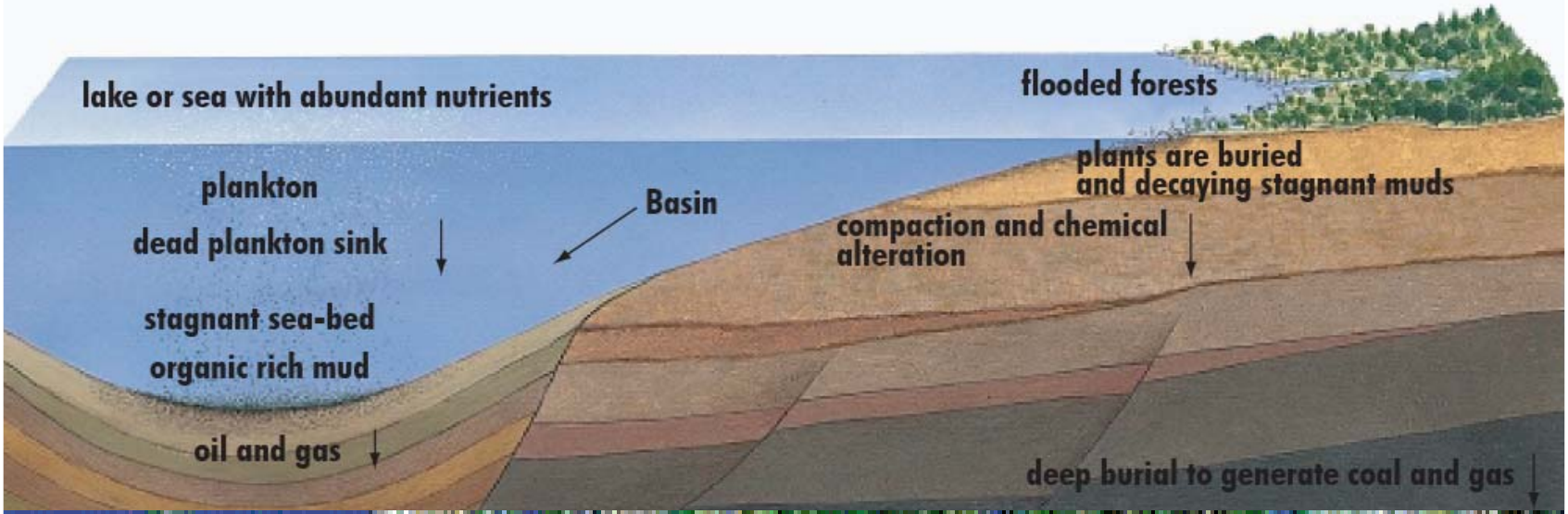


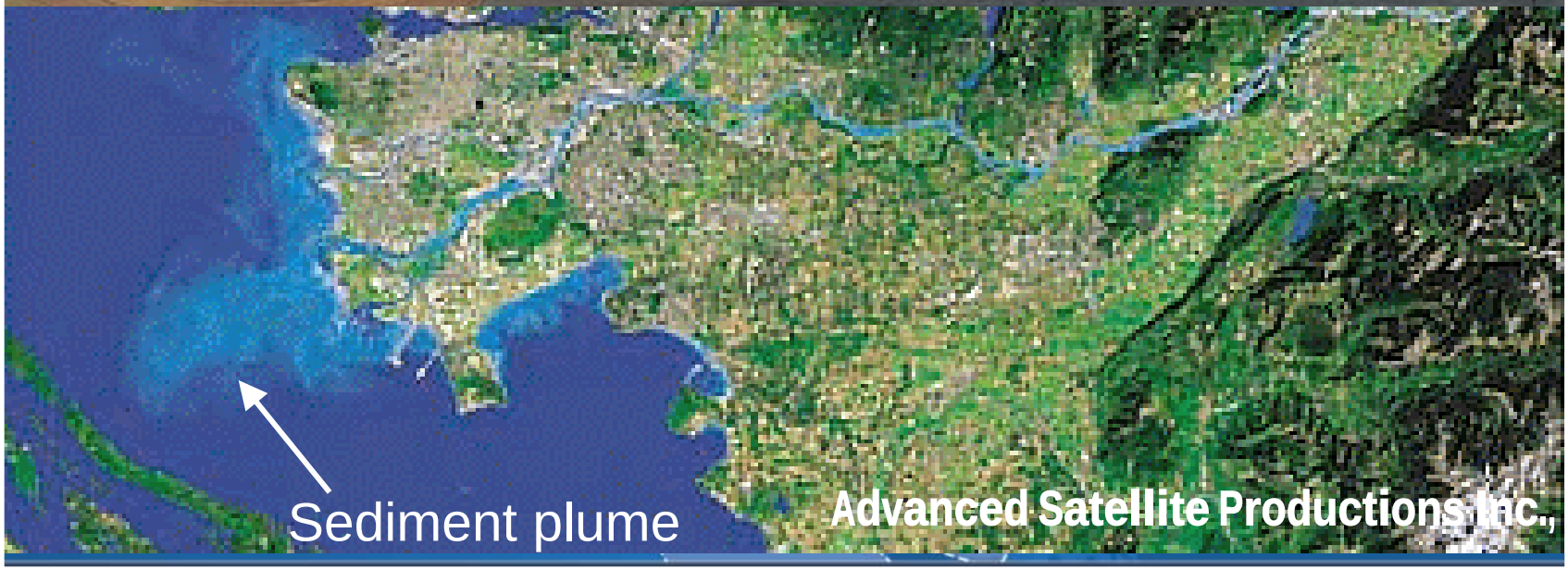
☆ **Natural Seep locations**

Indicators - Gas Hydrates

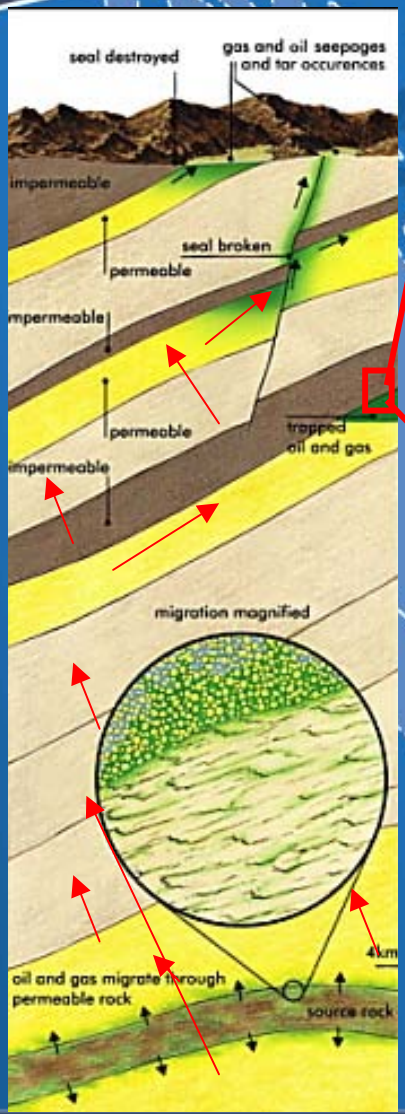
- Trawling catch off Van Isl
  Courtesy Spence U. Vic
- Gas hydrates = frozen methane gas
- Hydrates occur on the sea floor from decomposing organic material in the sediments
- Clear indicator of methane gas in the subsurface

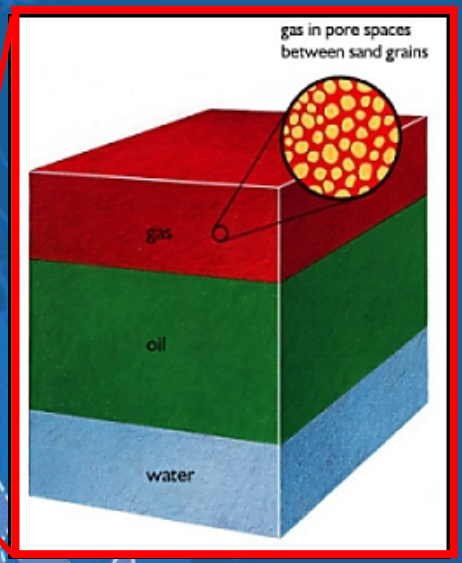
How does oil and gas form?





How does oil and gas accumulate ?

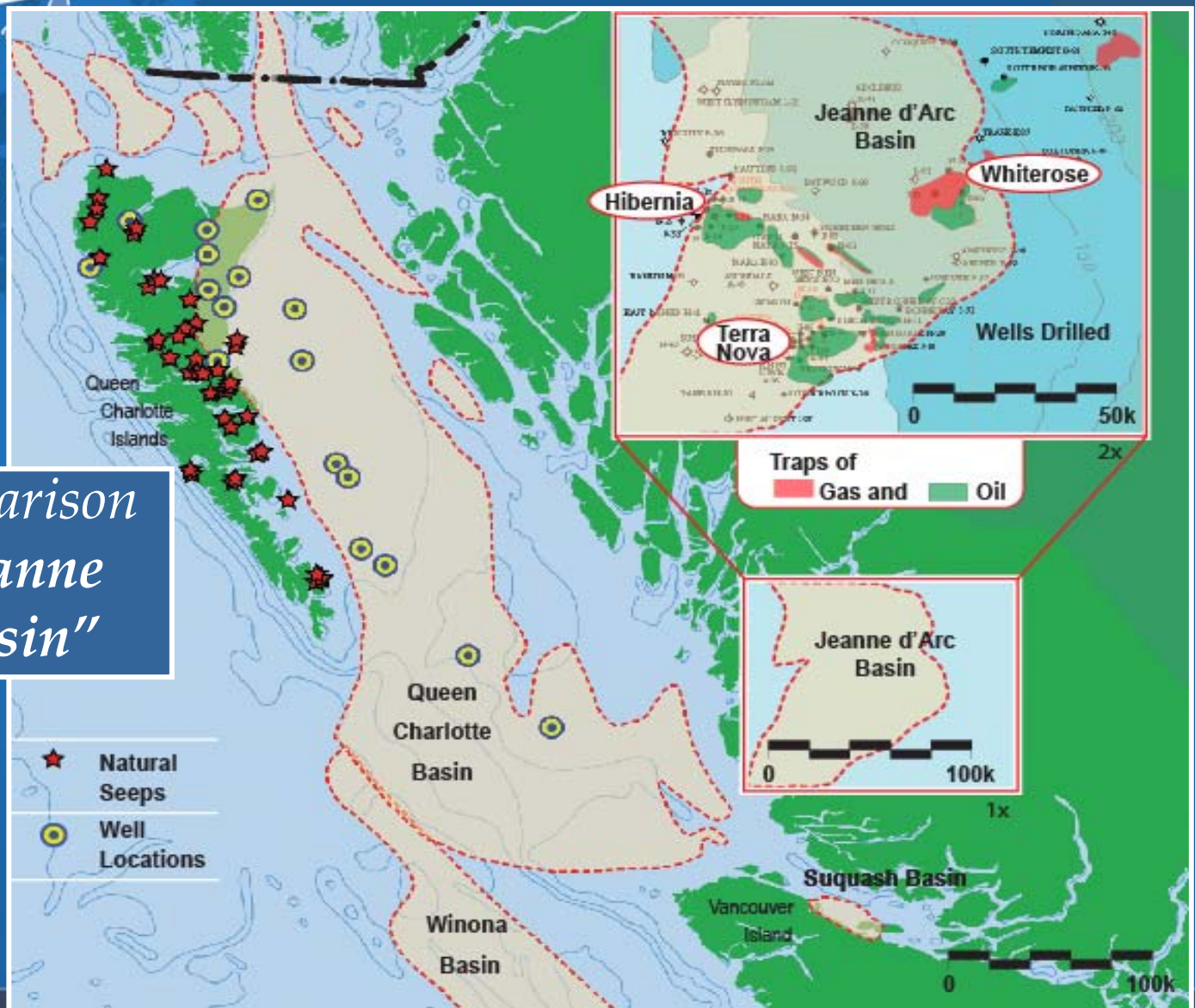




Gas and oil TRAPPED to form a POOL

- Oil and Gas migrates to surface
- If prevented from moving upwards, oil and gas becomes TRAPPED and forms a POOL or a cluster of POOLs to form a FIELD
- An undiscovered POOL or FIELD is called a PROSPECT
- Faults and folds forming the traps can be seen by seismic like an ultrasonic scan of a fetus
- Geologists estimate how many traps (FIELDs) their could be and how big they might be

Basin Comparison (size)



size comparison with "Jeanne d'Arc Basin"

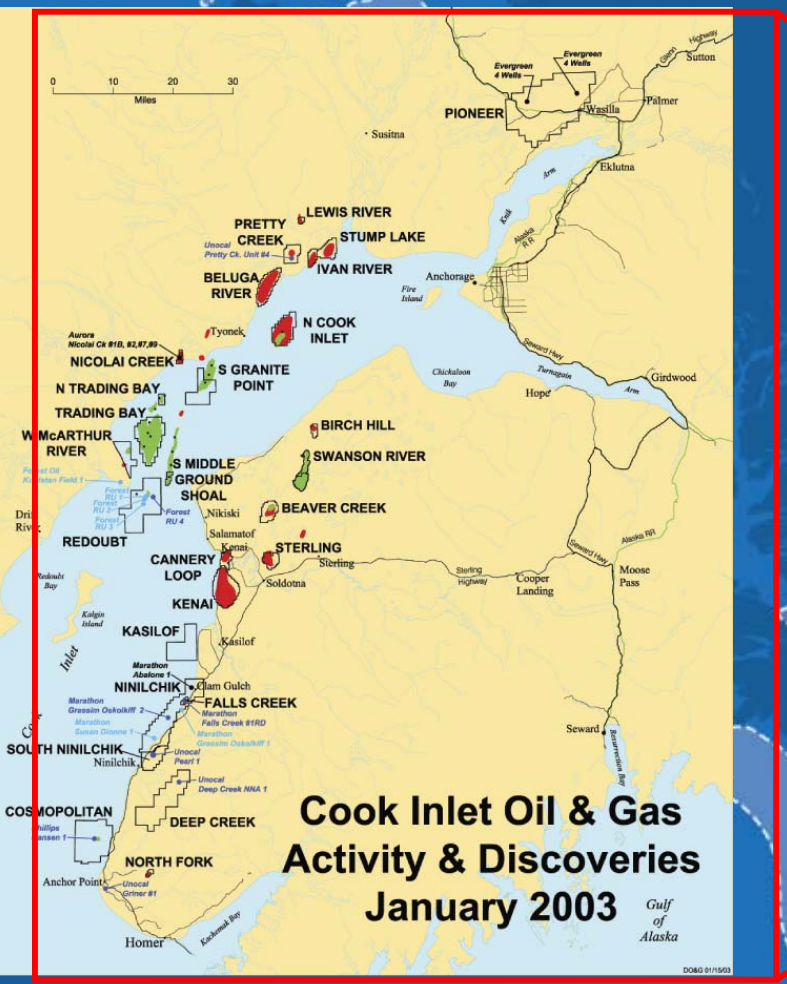
Coastline Comparison (worldwide)

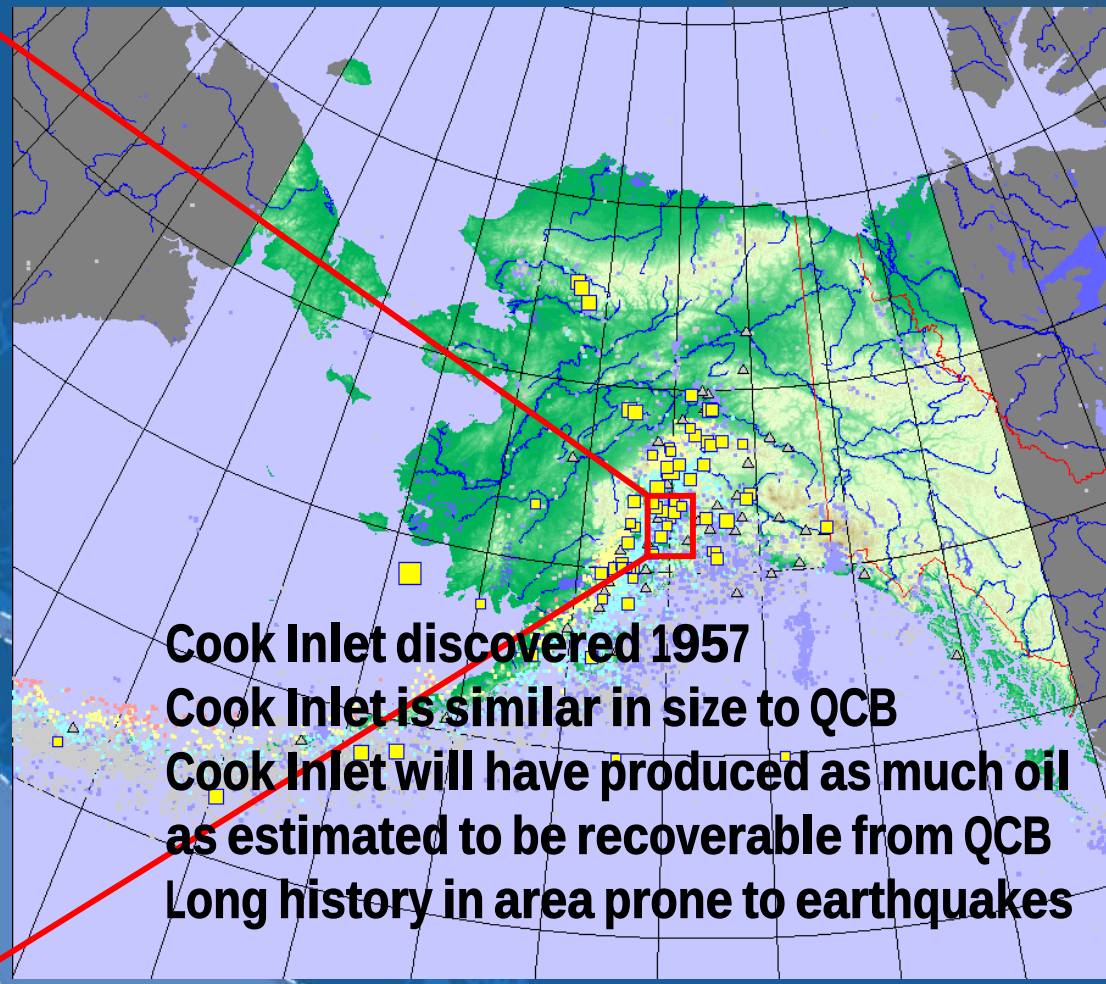
- BC coastline is similar to many other coastlines where there is a long history of oil and gas activity. While the similarities are not necessarily geological, BC has similar terrain (both oceanographically & topographically) to the coastlines of Norway, New Zealand and Chile

Coastline Comparison (West Coast of N.A.)

- Queen Charlotte Basin has geological similarities with California and Alaska (Cook Inlet) with similar age source rocks and reservoir rocks
- Cook Inlet and California are also located in a region prone to earthquakes

Case Study - Cook Inlet, Alaska





Cook Inlet discovered 1957

Cook Inlet is similar in size to QCB

Cook Inlet will have produced as much oil as estimated to be recoverable from QCB

Long history in area prone to earthquakes

Summary

*To do this the **moratorium** must be lifted*
The sort of industry activity which might be expected if the moratorium is lifted will be explained in the next module.
Thank you

- There is oil and gas offshore on the west coast of BC
- With the current data, however, we can only estimate how much there might be, do not know where it is located, nor can we determine if it is present in sufficient amounts to be commercial
- We need to acquire new seismic data and ultimately drill more exploration wells.

END OF MODULE 1