

Where is the next Permian ?

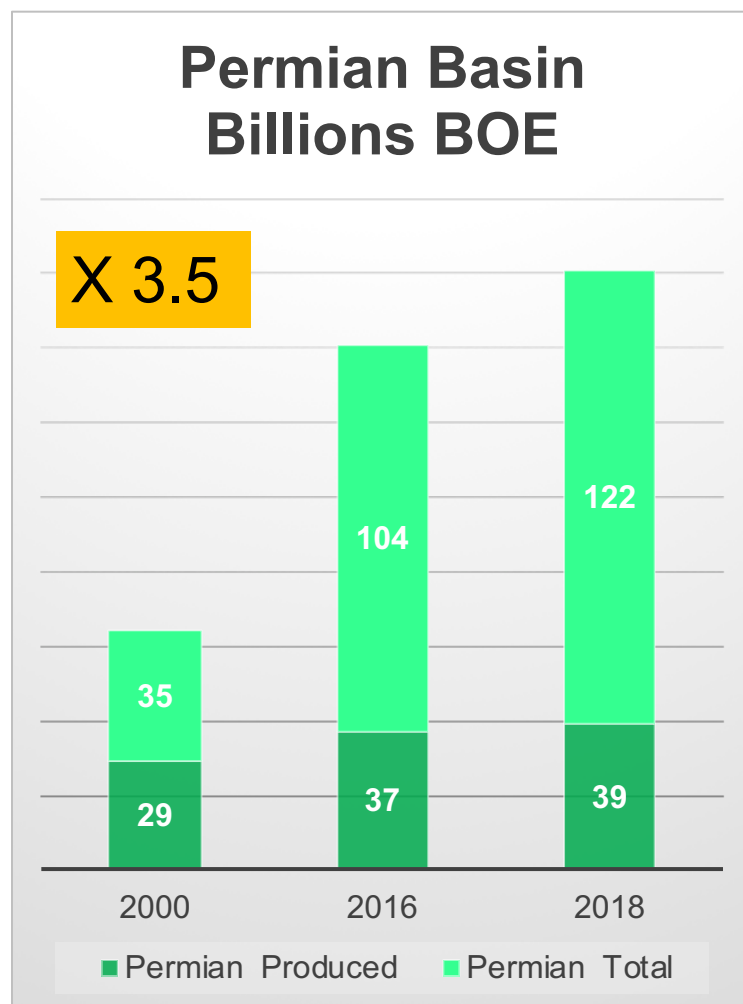
Bob Fryklund, Chief Strategist- Upstream

Maz Zarea , Upstream Research

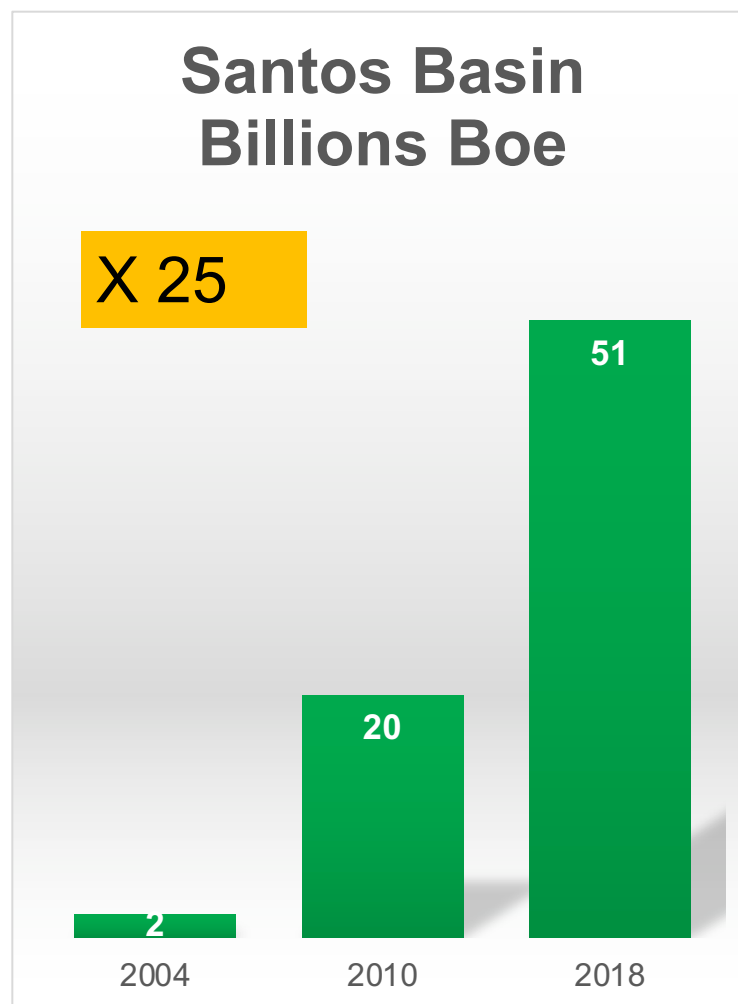


What are we looking for ?

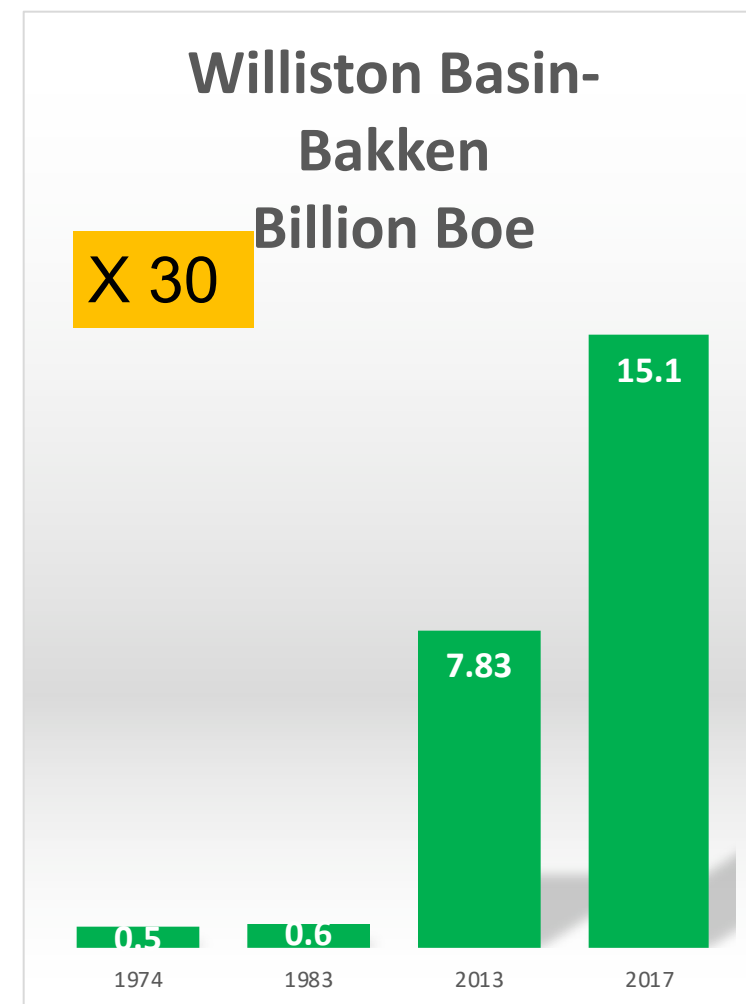
Recoverable reserves



Source: IHSMarkit; USGS 2000,2016,2018



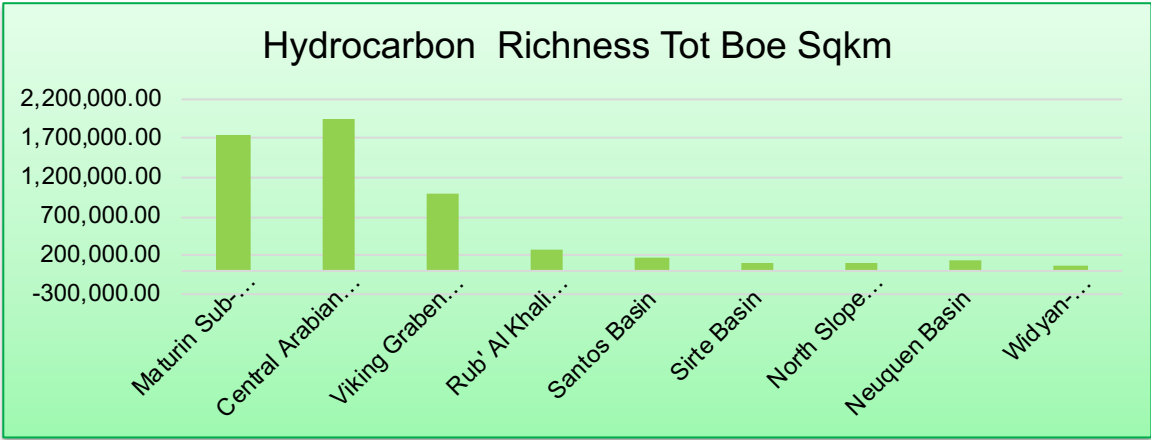
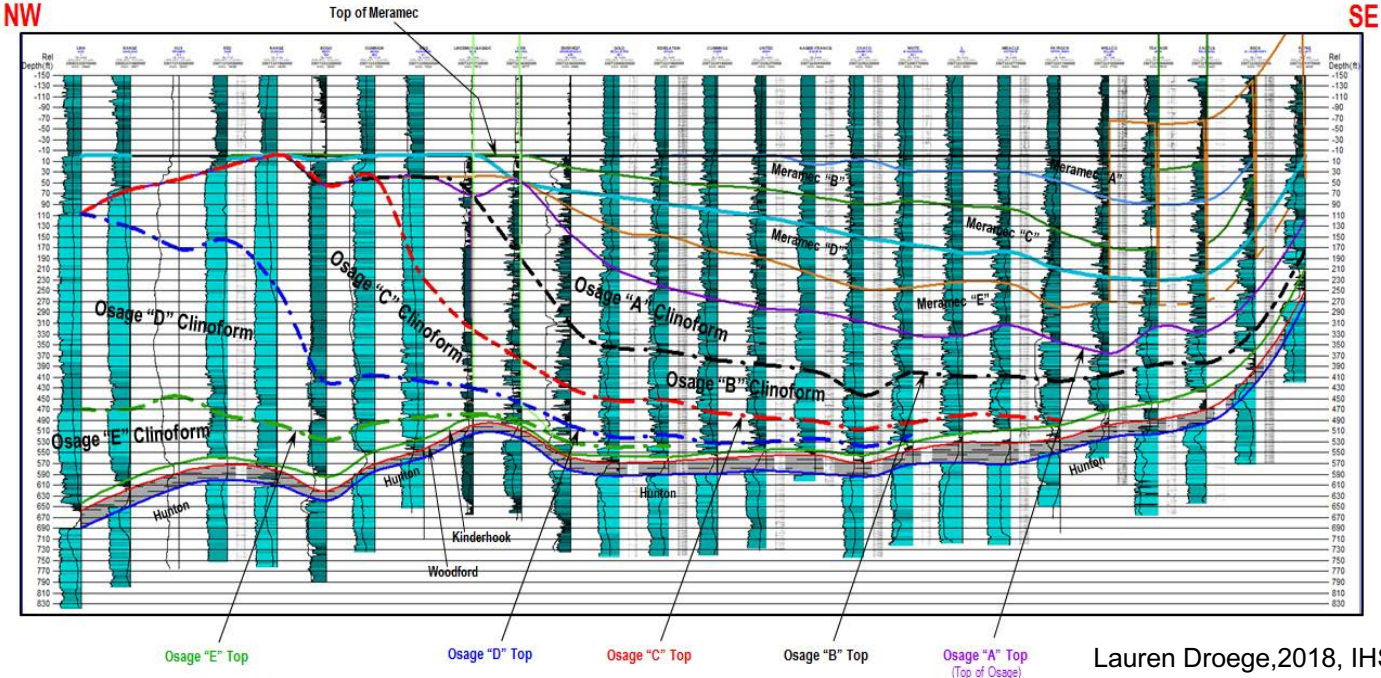
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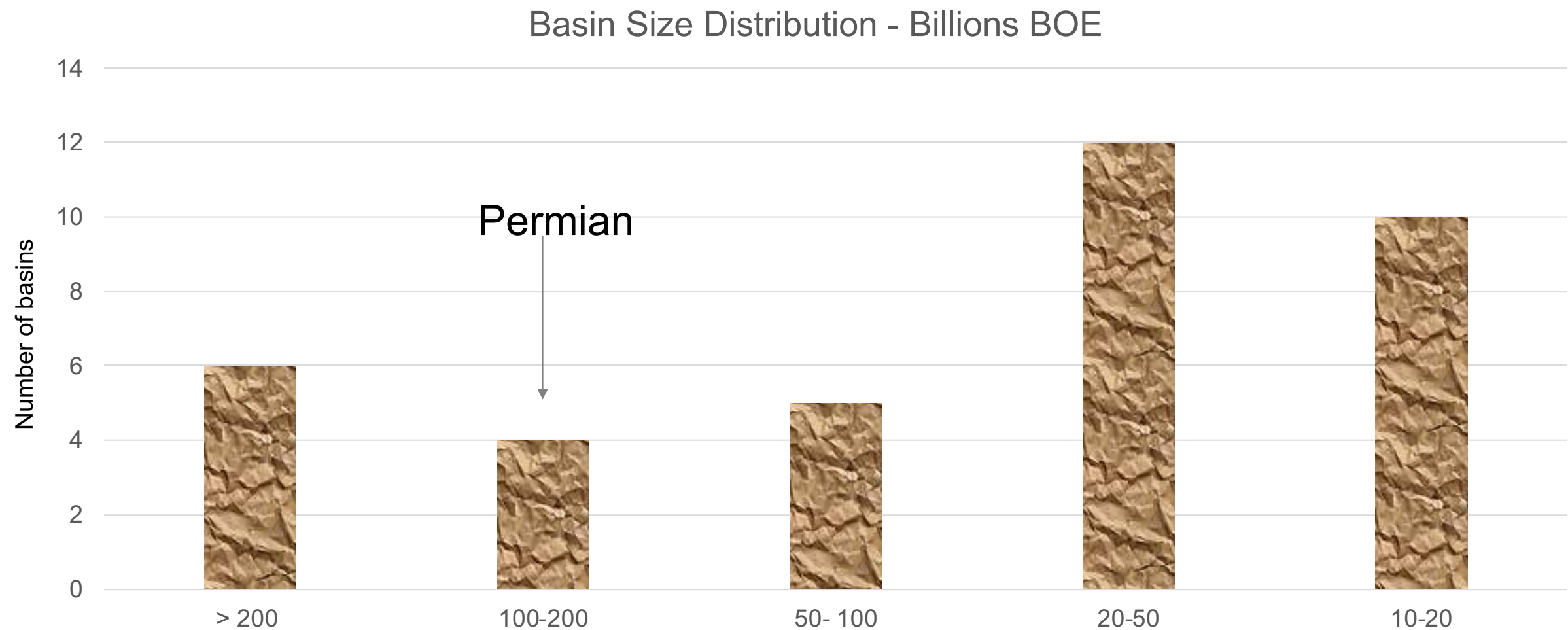
Criteria– select geologic characteristics

Common characteristics	
Volumes	High in place resources -- sq/km > 100mmboe
Basin History	Late filling –with 5000+ m fill
	Mesozoic reservoirs/ source
	Marine / often salt
Charge timing/ source rocks	Recent charge
	Overpressure over sweet spots
	Currently active generating source rocks
Petroleum systems	Multiple distinct petroleum systems- Mesozoic

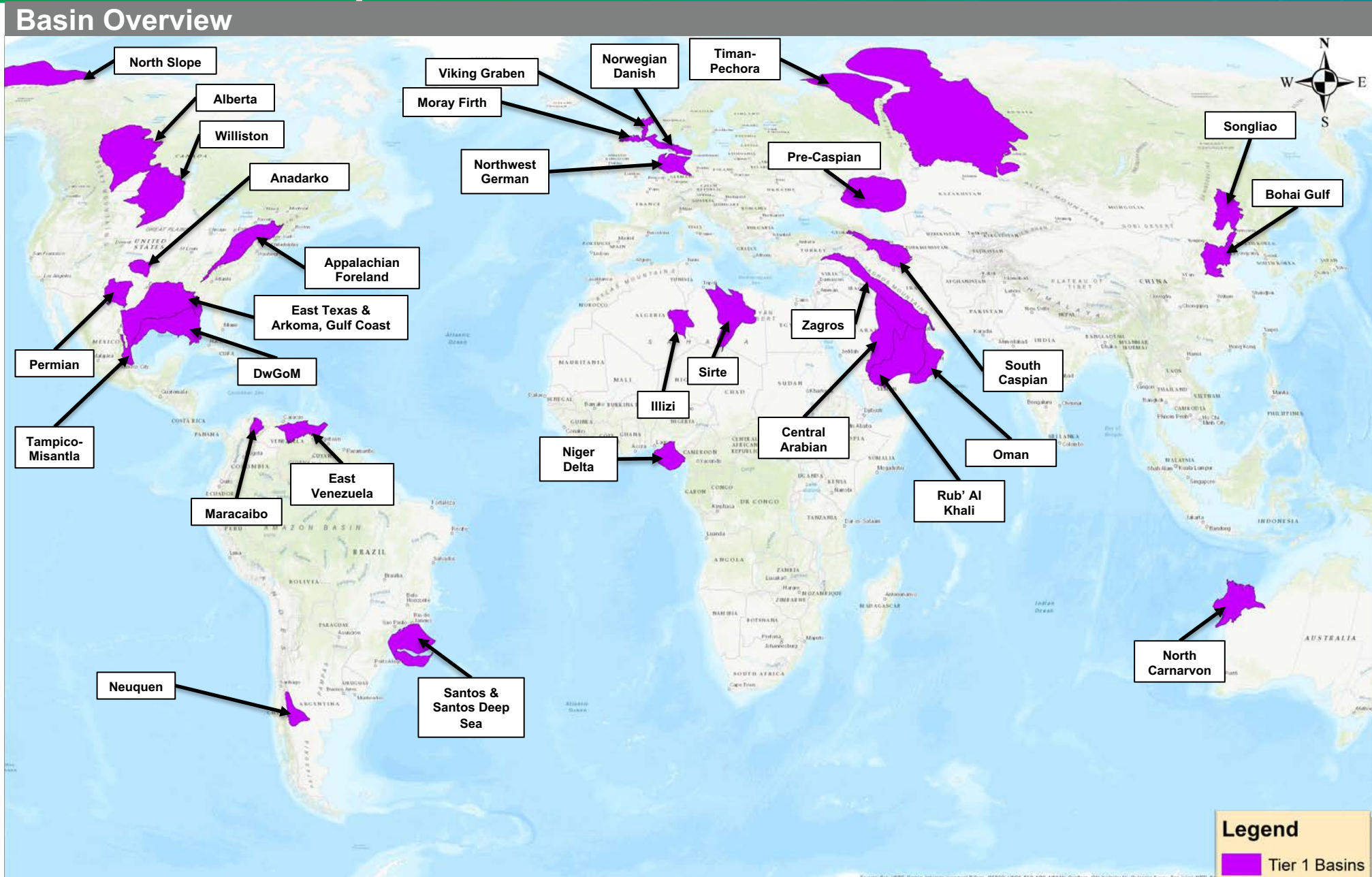


How rare is the Permian ...

Basin Size

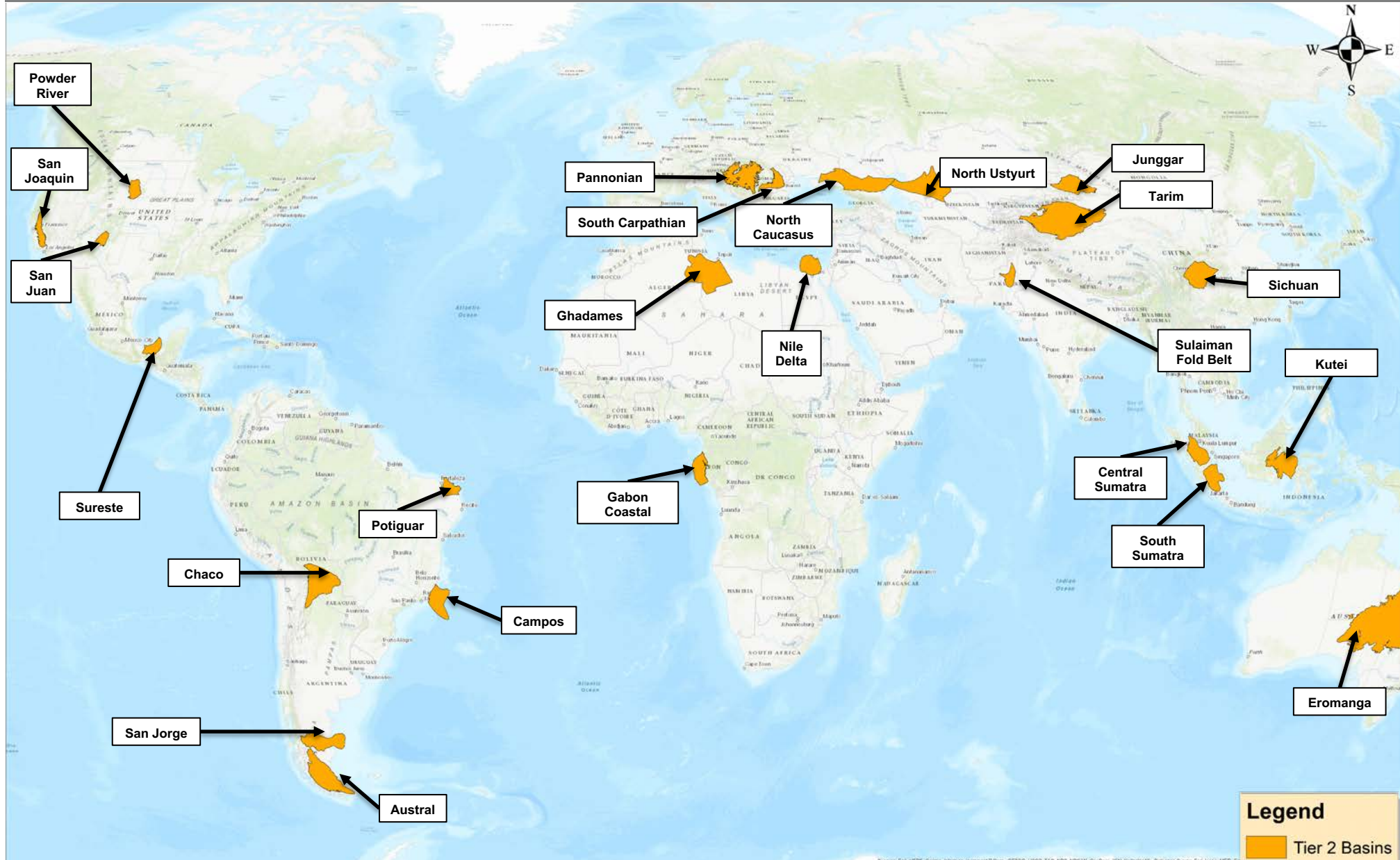


Candidates- Tier 1 Super basins

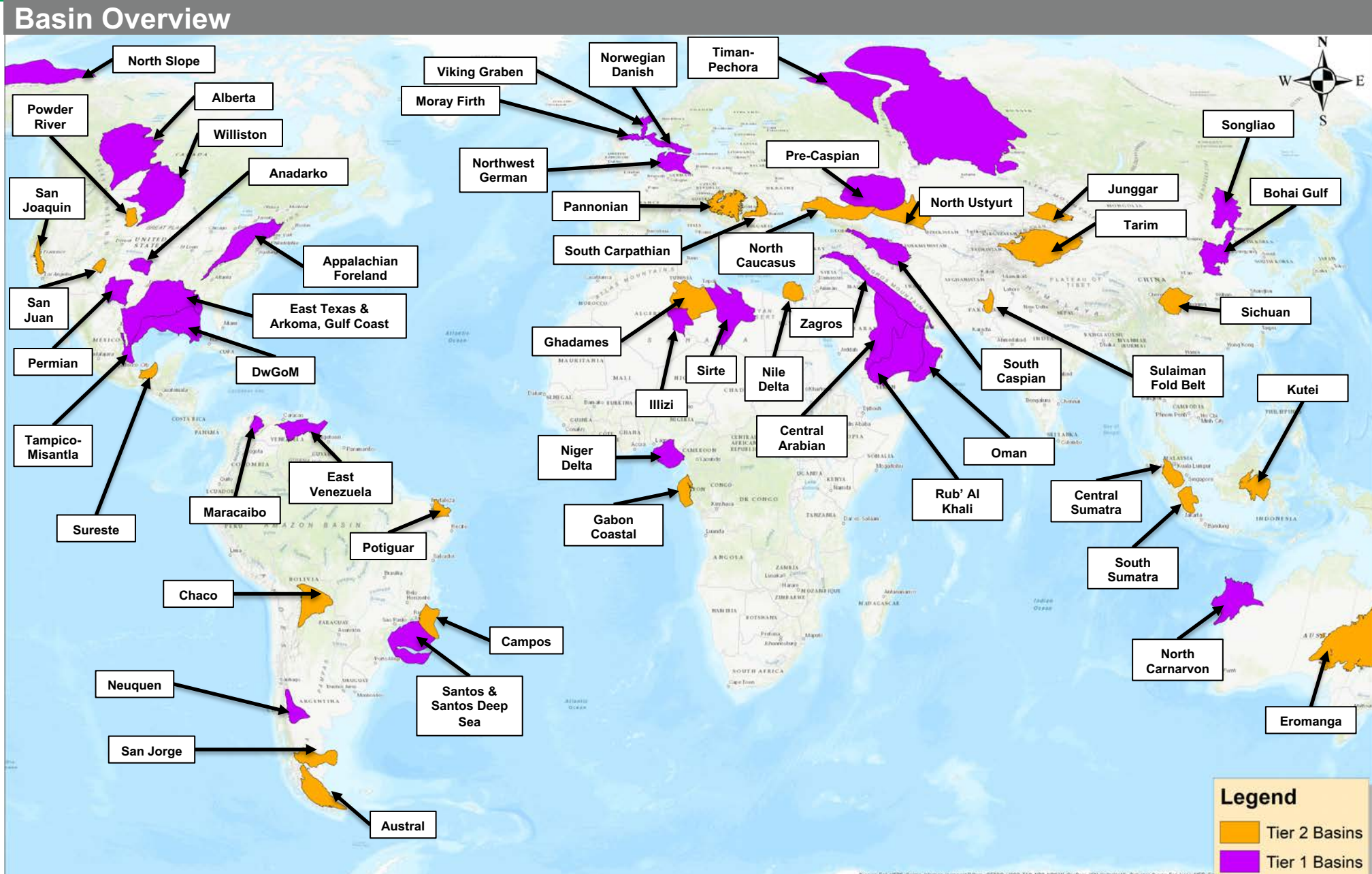


Candidates- Tier 2 Super basins

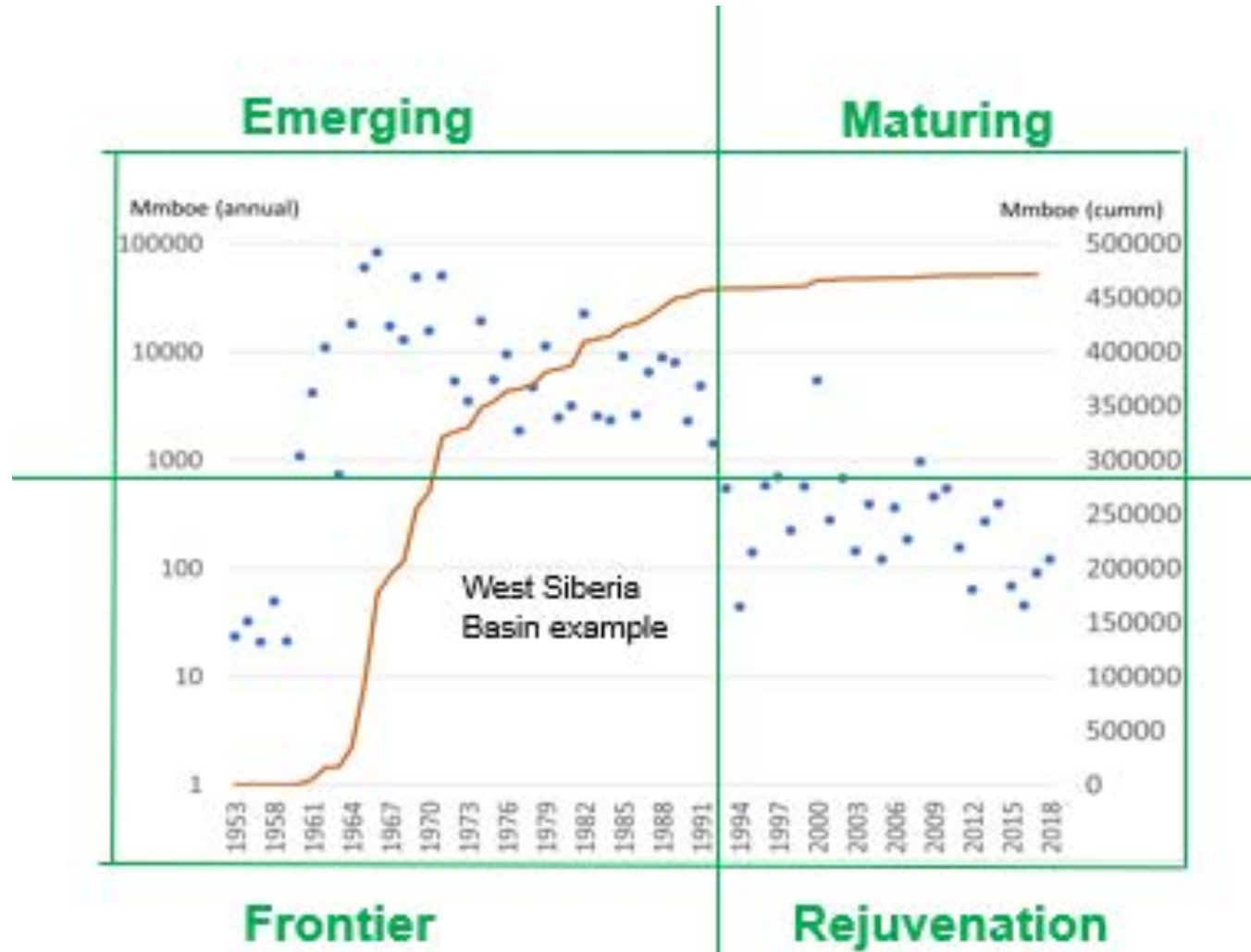
Basin Overview



Combined Tier 1- 2



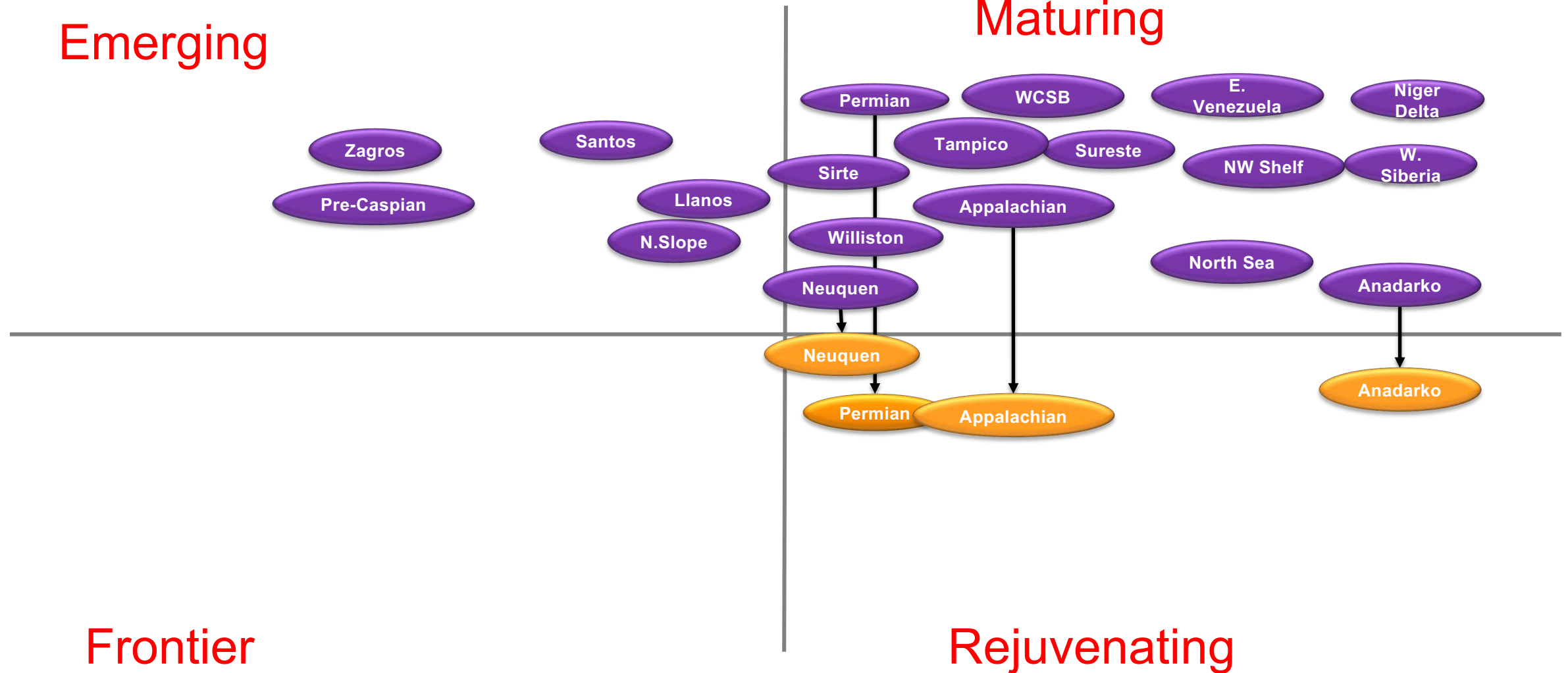
Criteria -- Basin stage



Leveraging basin stage ...

Emerging

Maturing



Frontier

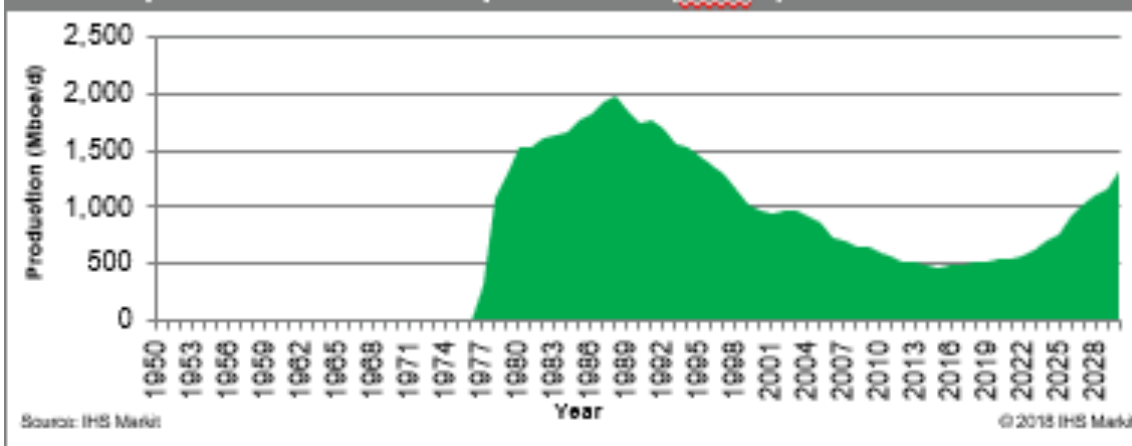
Rejuvenating

Stacking them up-- Building a screening list ...

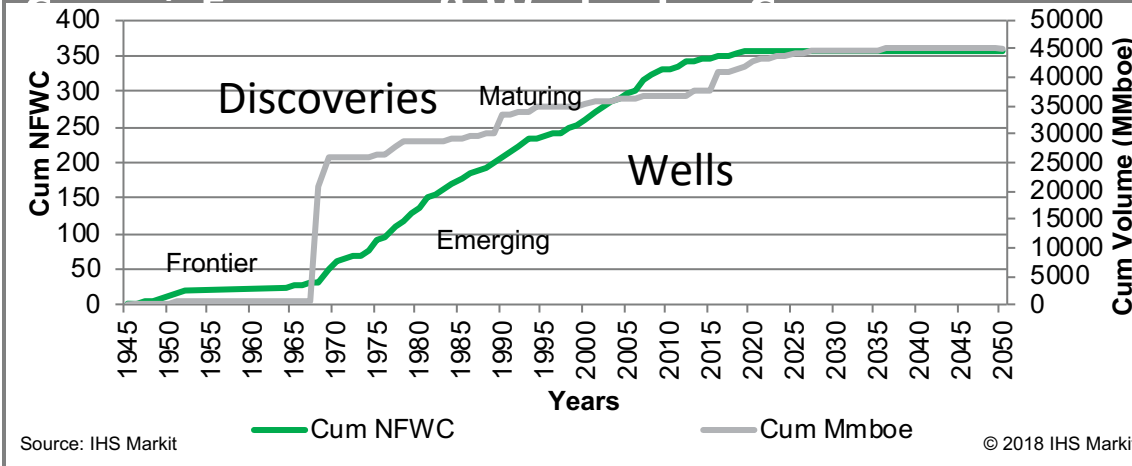
Basin Name	Maturity Stage	Fill Depth History	Petroleum Systems	Richness Per Sq Km MBoe	Remaining Resource Estimate Billions BOE	Comments
Zagros	Emerging	Mesozoic, Permo-Triassic salt	-4 , Mesozoic, Cenozoic	209,000	224	Arrested/ conflict
Pre-Caspian	Emerging	Late Cret fill on salt; 20,000 meters	- 1 Permo-Triassic; Cret. ?	24,800	55	Margins not fully tested
North Slope	Emerging/ mature	Late fill Cenozoic/Mesozoic 7000 m	- 5.Miss.; Permo-Triassic ; Mesozoic	97,000	22	Areas arrested – access issues
Sirte	Mature	Thin Cenozoic fill 7000 m; syn rift basin	- 1- Cen.to basement	109,000	18	Arrested/ conflict

Candidates - North Slope Basin

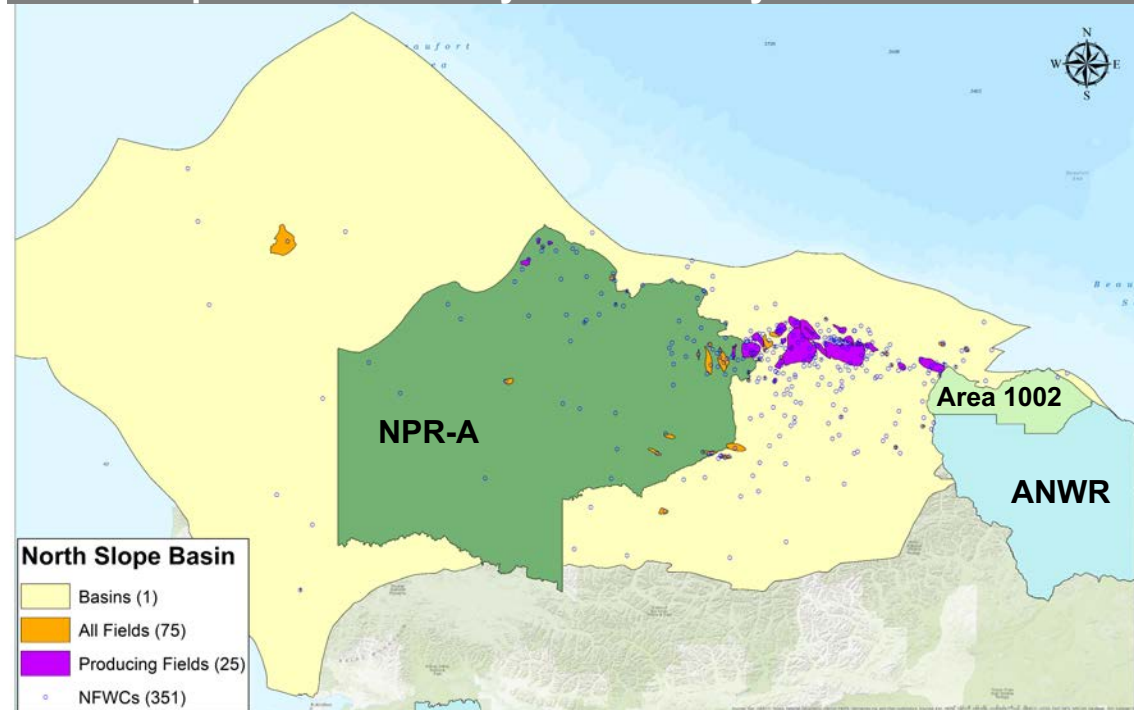
North Slope Production Total Oil Equivalent Rate (Mboe/d)



North Slope Cumulative Discoveries Vs. Cumulative NFWCs

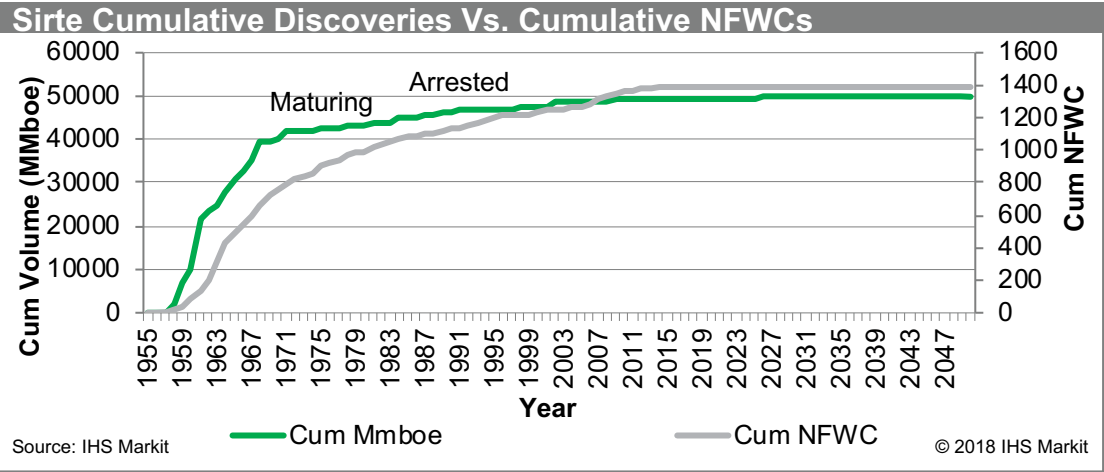
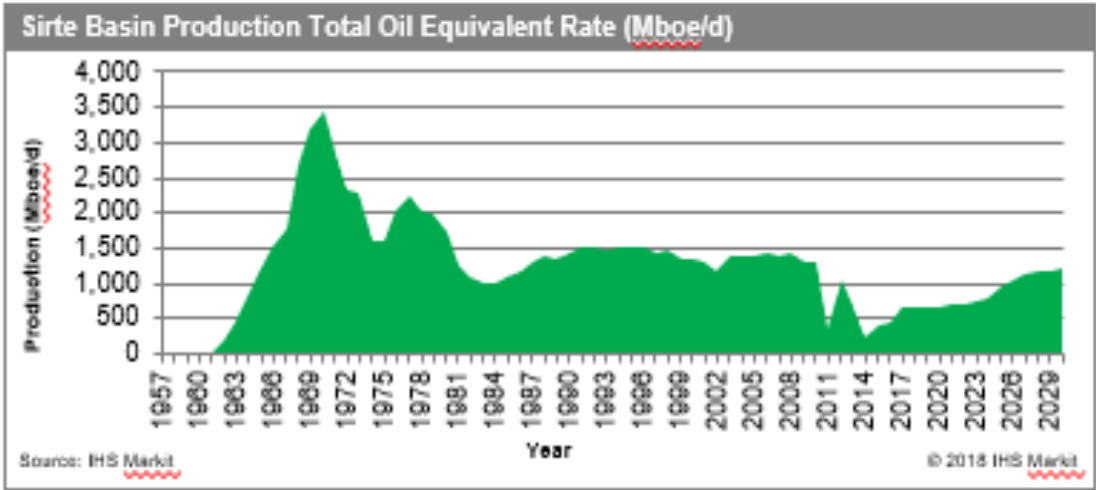


North Slope Basin – Activity as of January 2019

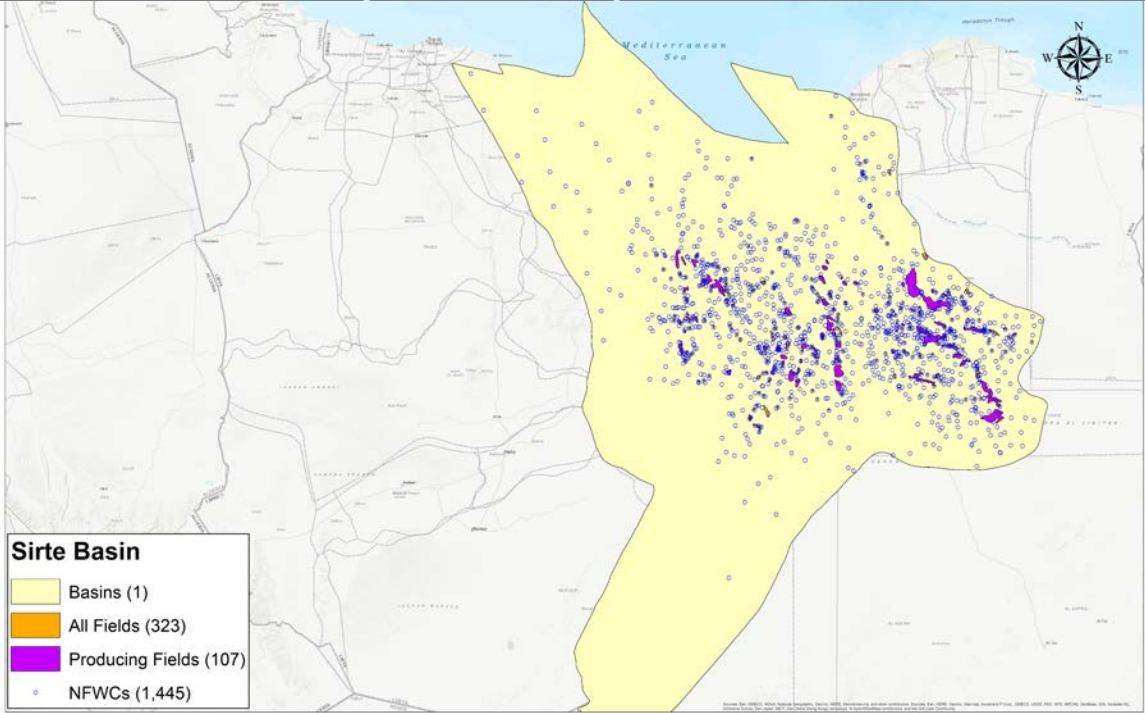


Resource Overview	No. of Fields	Tot Recoverable PP Reserves	Cumulative Tot Production	Total Remaining PP Reserves
Oil and Gas (Bboe)	75	40	18	21 (52%)

Candidates - Sirte Basin



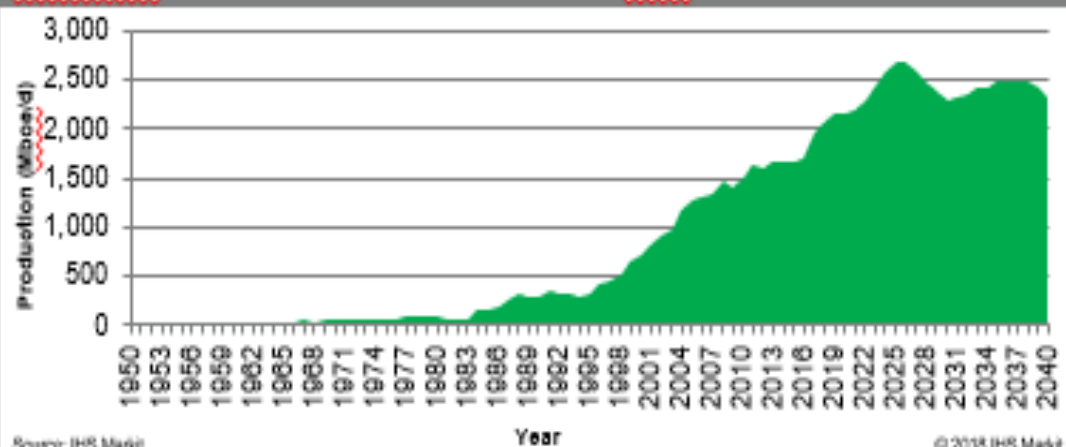
Sirte Basin – Activity as of January 2019



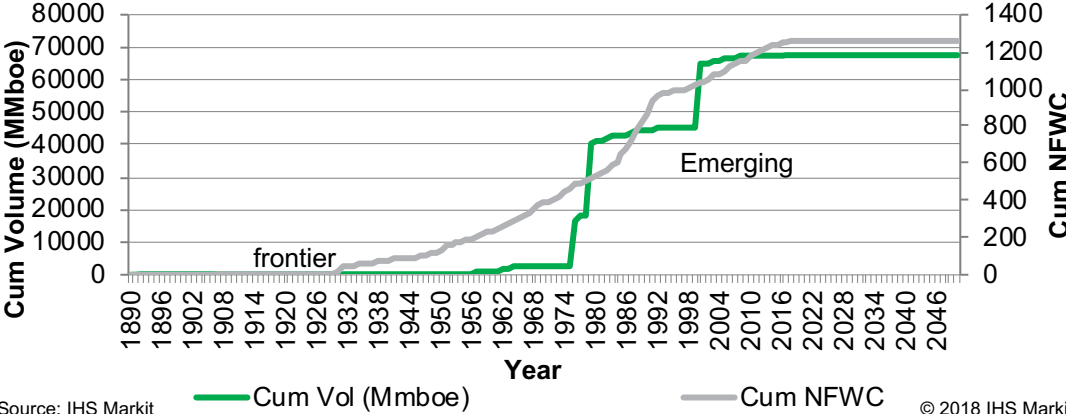
Resource Overview	No. of Fields	Tot Recoverable PP Reserves	Cumulative Tot Production	Total Remaining PP Reserves
Oil and Gas (Bboe)	323	49	30	18

Candidates – Pre-Caspian Basin

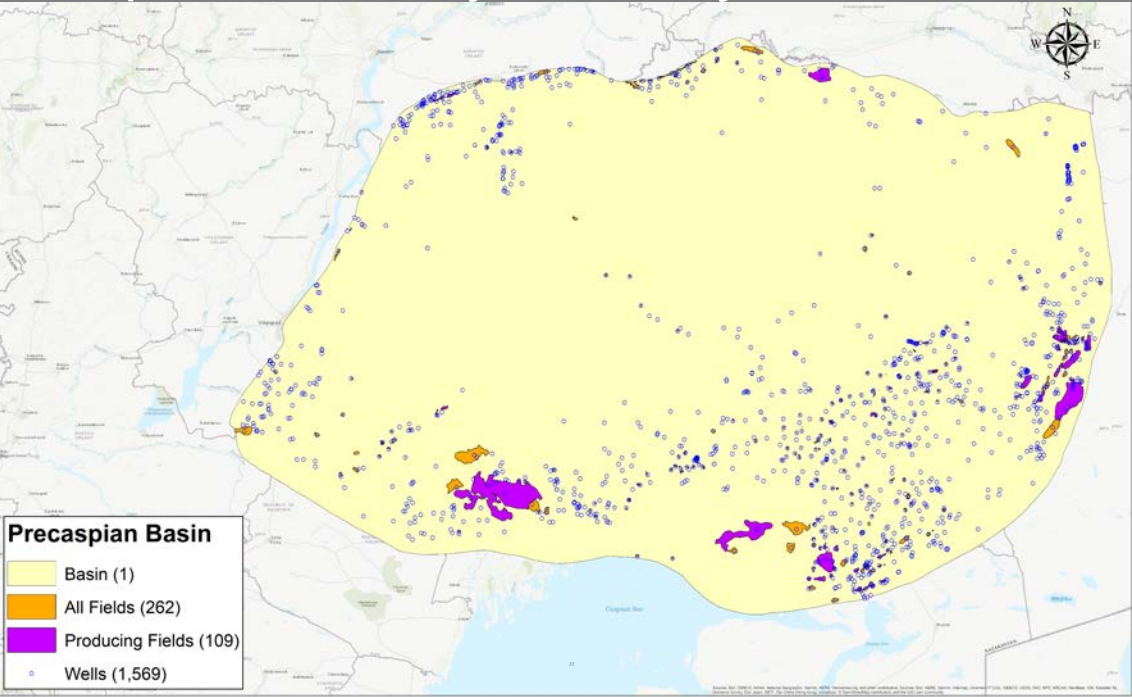
Precaspian Production Total Oil Equivalent Rate (Mboe/d)



Precaspian Cumulative Discoveries Vs. Cumulative NFWCs



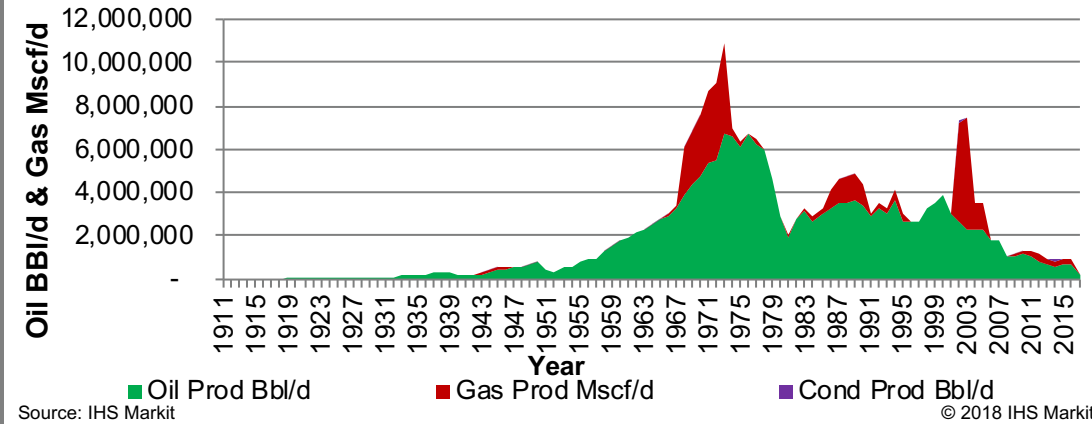
Precaspian Basin – Activity as of January 2019



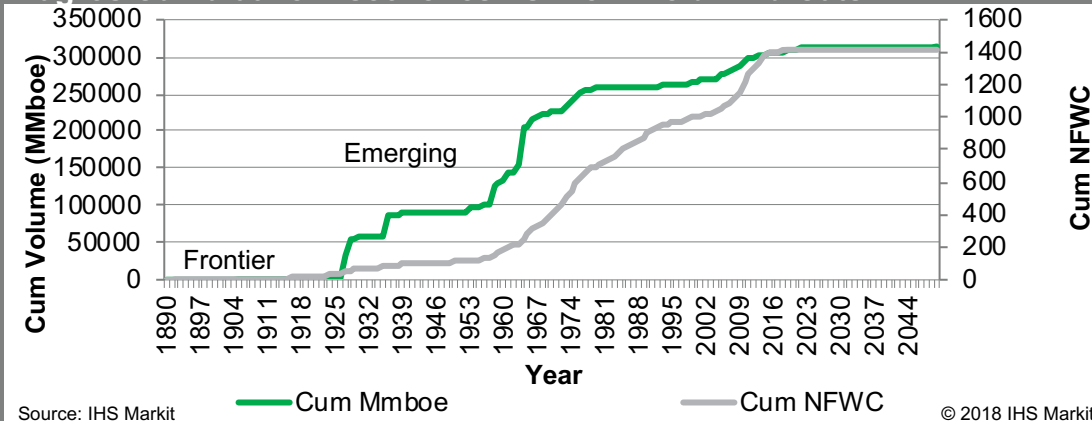
Resource Overview	No. of Fields	Tot Recoverable PP Reserves	Cumulative Tot Production	Total Remaining PP Reserves
Oil and Gas (Bboe)	262	67	12	55

Candidates – Zagros Province Basin

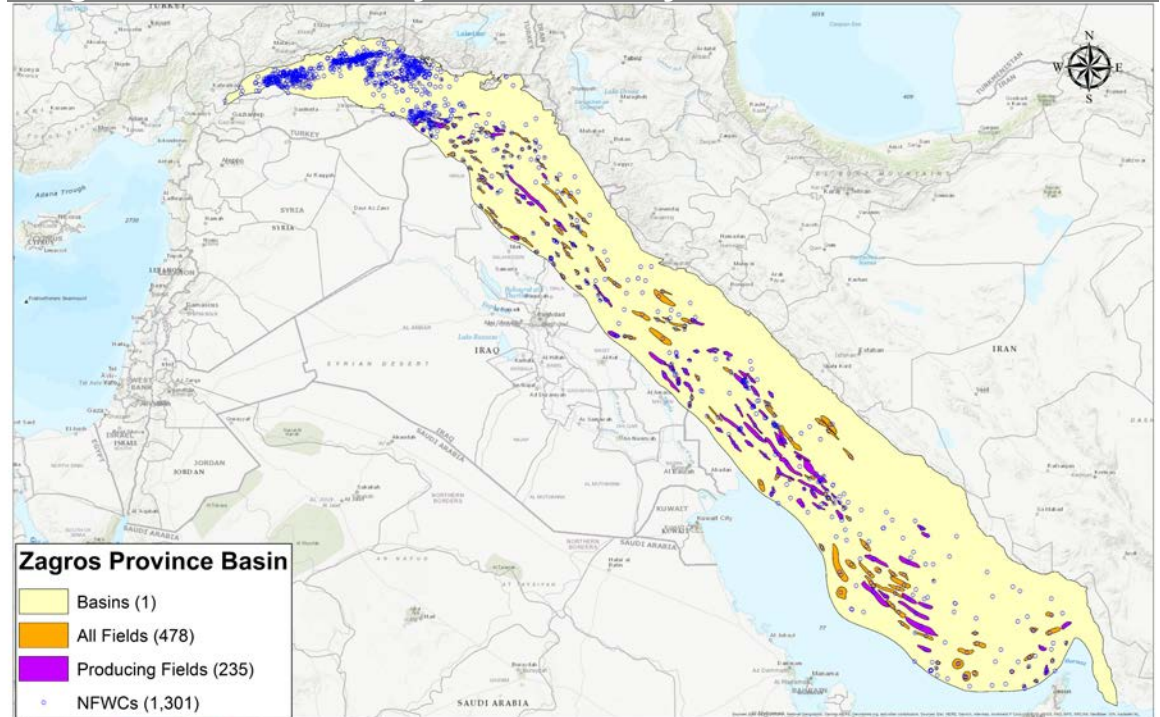
Zagros Basin Annual Production by Day



Zagros Cumulative Discoveries Vs. New Field Wild Cats

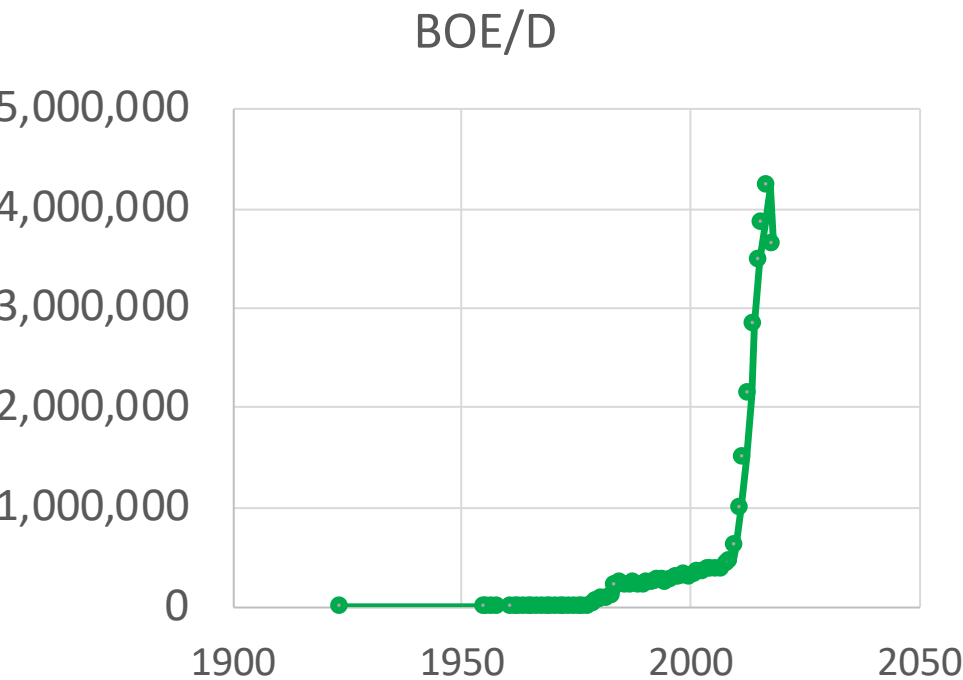


Zagros Basin – Activity as of January 2019



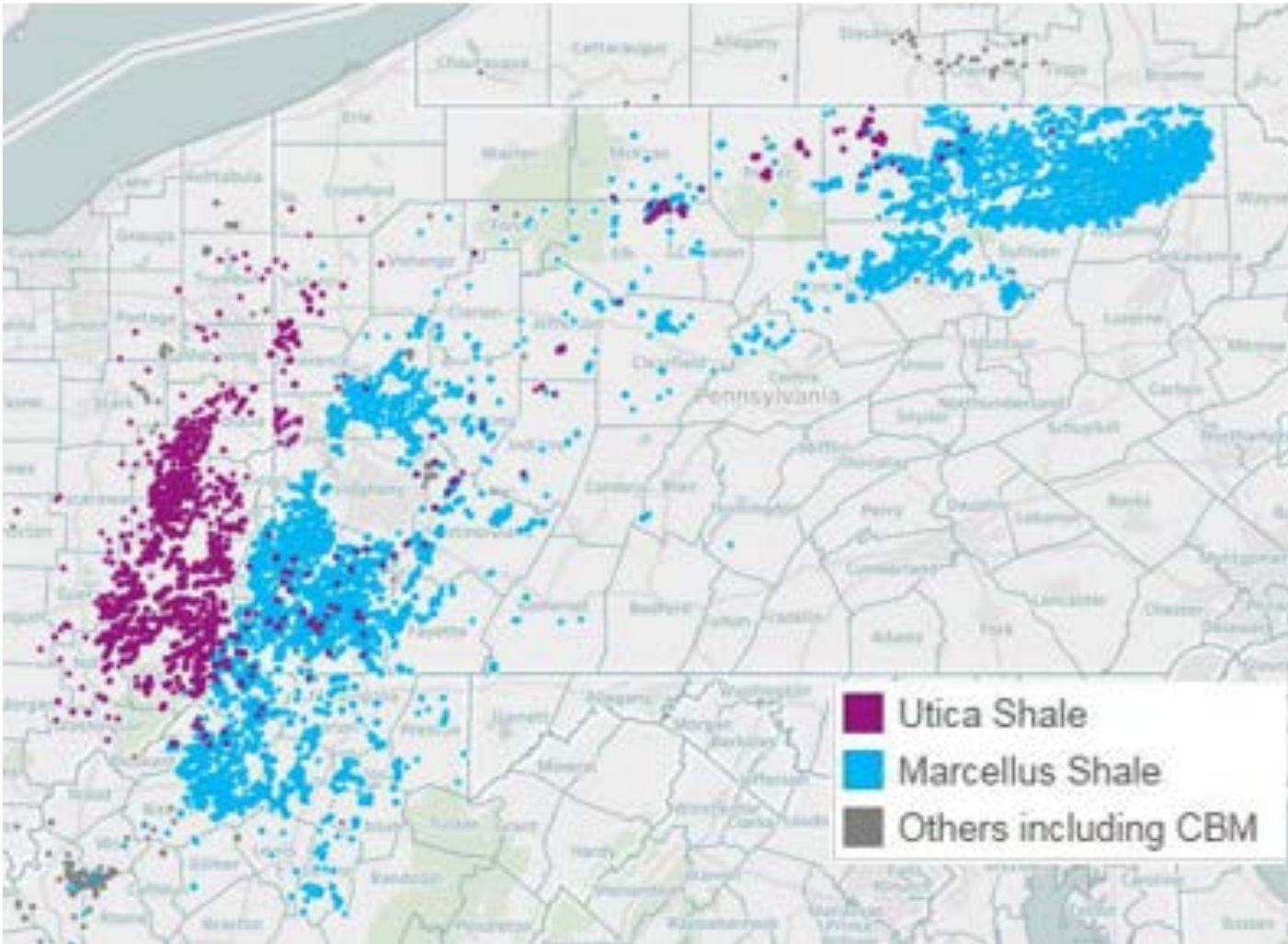
Resource Overview	No. of Fields	Tot Recoverable PP Reserves	Cumulative Tot Production	Total Remaining PP Reserves
Oil and Gas (Bboe)	478	306	82	224

Appalachian Basin– already passed the test



Appalachian Basin		
Resources TCF		
2010	372	
2018	732	

IHSMarkit internal reports



Where from here ?

- Building a list ... starting with tier 2 ?
- What other geologic factors help define potential Permian like basins ?
- How many offshore basins might be candidates ?
- Is there information/ technology missing that could open up more basins ?

Tools

- International Data base
- Global Plays and Basins
- North American Supply Analytics-
- North America wells and production data
- International wells and production data, EDIN
- International supply outlooks

Contributors

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