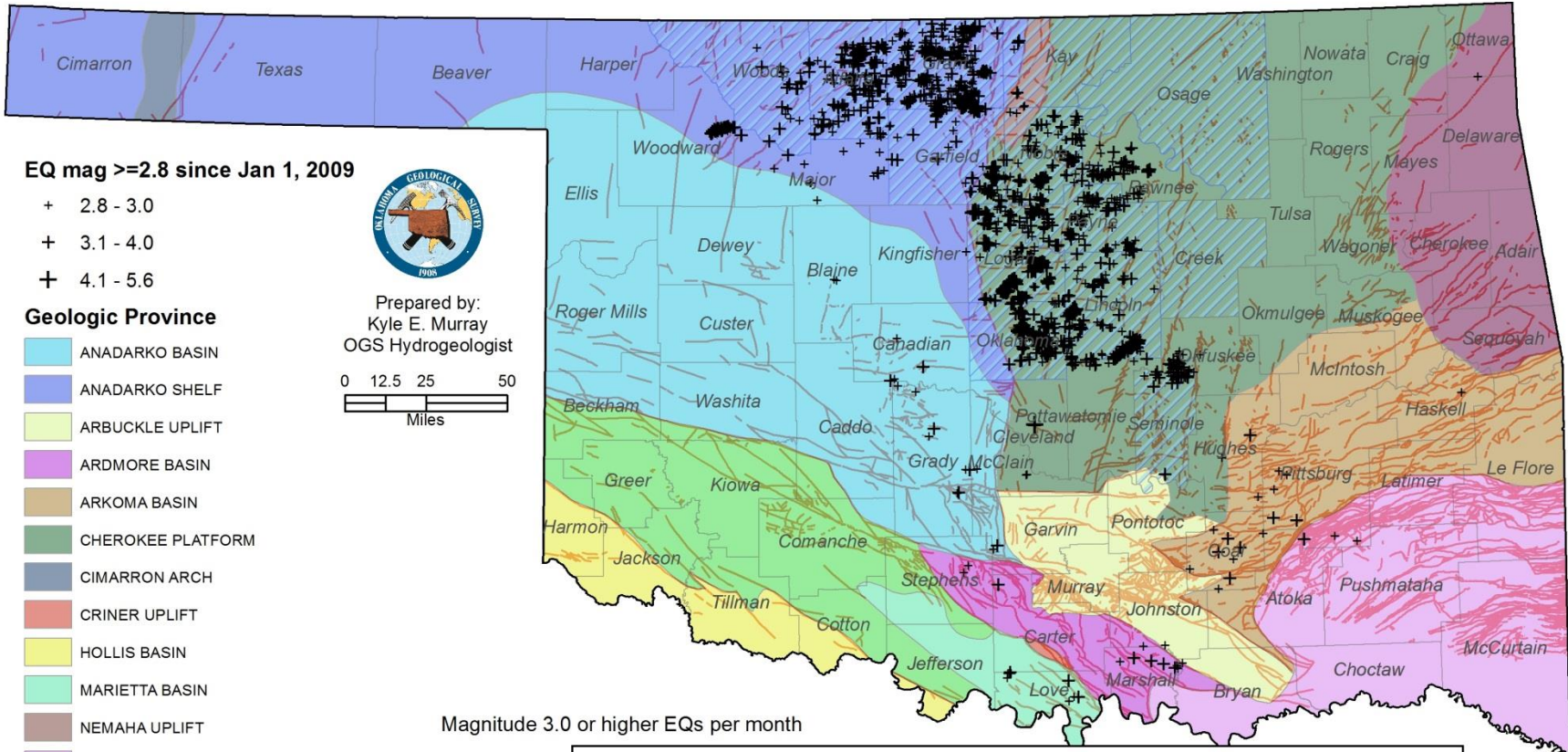
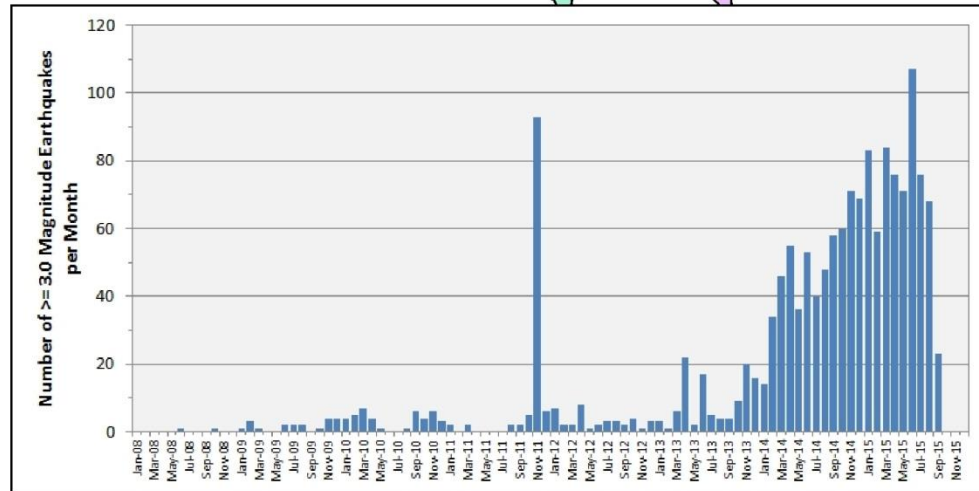


Map of Earthquakes Mag ≥ 2.8 for Jan 1, 2009–Sep 14, 2015



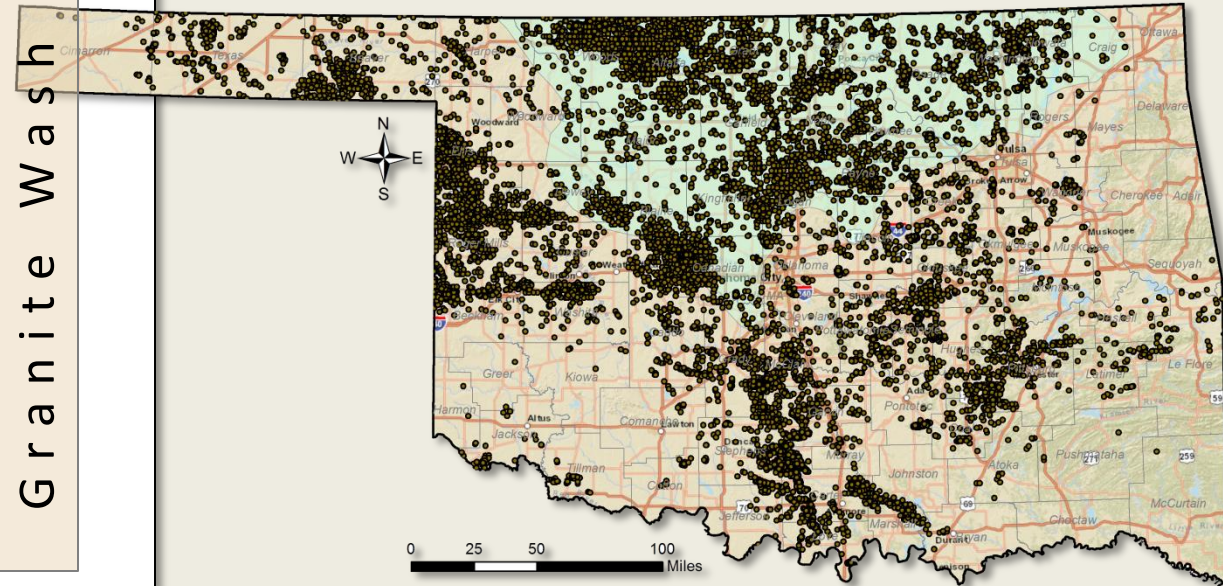
Magnitude 3.0 or higher EQs per month



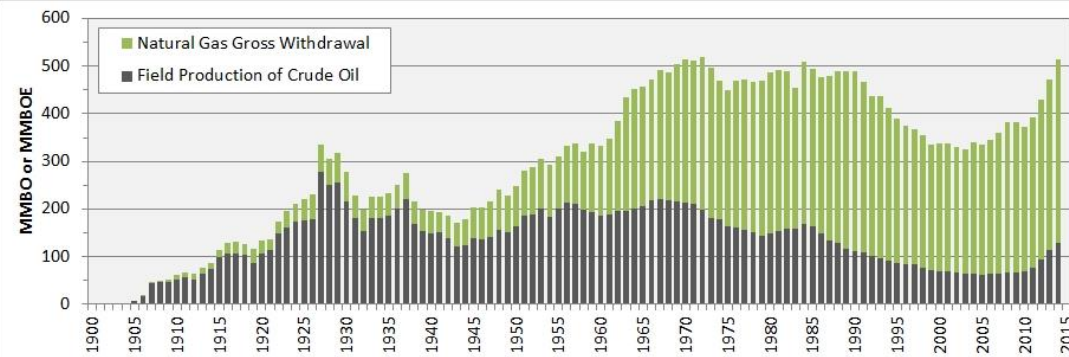
(Murray, 2015 – in preparation)

Most Prominent Producing Zones

Zone	Group	Formation	
Permian		Garber	Granite Wash
		Brown Dolomite	
		Pontotoc	
		Belveal	
Virgilian		Cisco Lime	
		Pawhuska	
		Endicott	
		Tonkawa	
Missourian	Hoxbar	Lansing	
		Cottage Grove	
		Kansas City	
		Hogshooter	
		Layton	
		Cleveland	
		Oswego	
Desmoinesian	Marmaton	Skinner	
	Cabaniss	Red Fork	
	Krebs	Burbank	
		Bartlesville	
		Hartshorne	
		Gilcrease	
Atokan-Morrowan	Atoka	Dutcher	
	Morrow	Cromwell	
	Springer	Wamsley	
	Chester	Manning	
Mississippian	Meramec	Caney	
		Miss Lime	
		Miss Chat	
		St. Louis	
		Mayes	
	Osage	Sycamore	
Kinderhook	Kinderhook		
Woodford	Upper Devonian	Woodford	
Dev to Mid Ord	Middle Devonian	Misener	Key to Symbols
	Lower Dev - Silurian	Hunton	Sandstone
	Cincinnatian	Sylvan	Carbonate
		Viola	
		Simpson	Bromide
	Wilcox		
	McLish		
Oil Creek			
Arbuckle	Arbuckle Group	West Spring Creek	Coal
		Kindblade	
		Butterly Dolomite	
Basement & Crystalline Rock	Cambrian	Reagan	
	Pre-Cambrian	Granite	



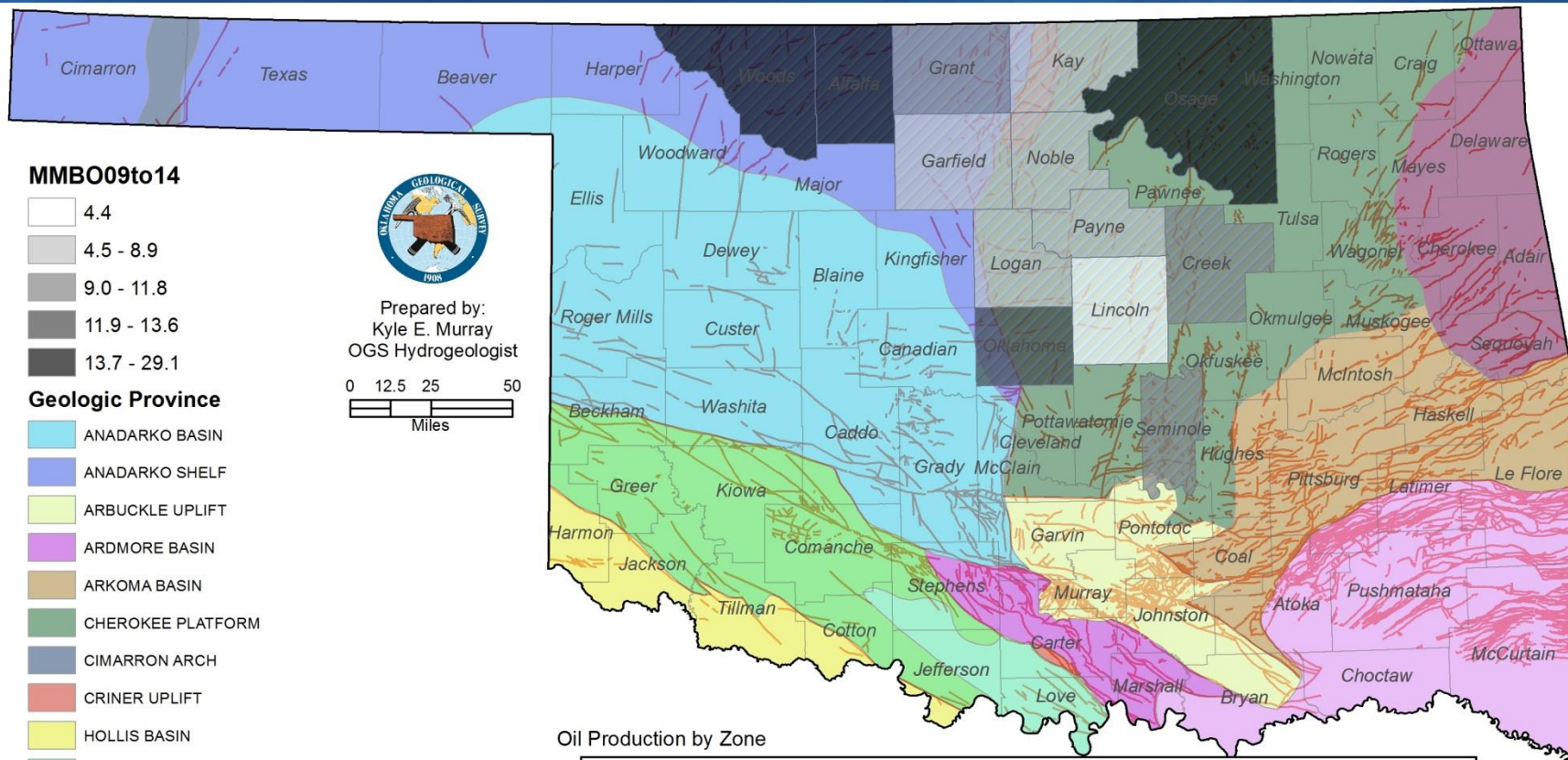
O&G Wells Completed (Jan 2010–May 2014)



Annual O&G Production in Oklahoma (1900–2014)

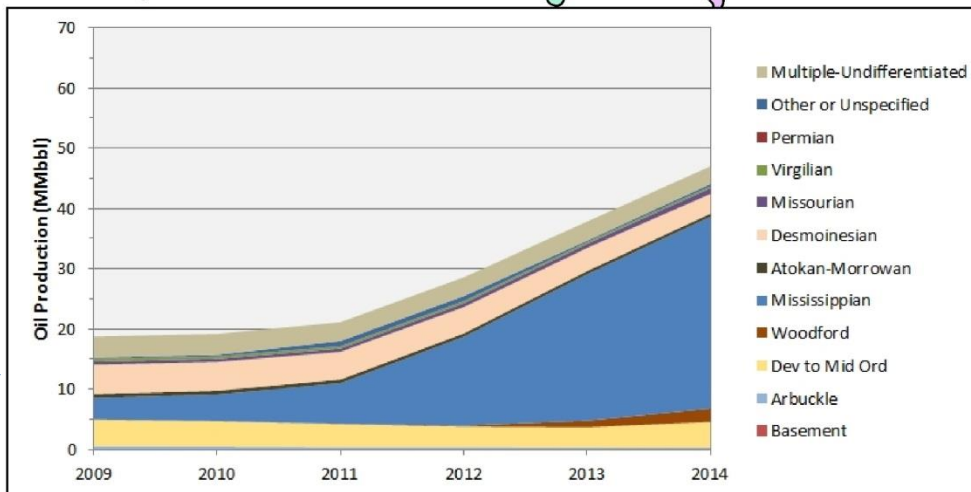
OKCGS Shale Shaker
(Murray and Holland, 2014)

Oil Production by Zone for 13 Study Area Counties, 2009–2014



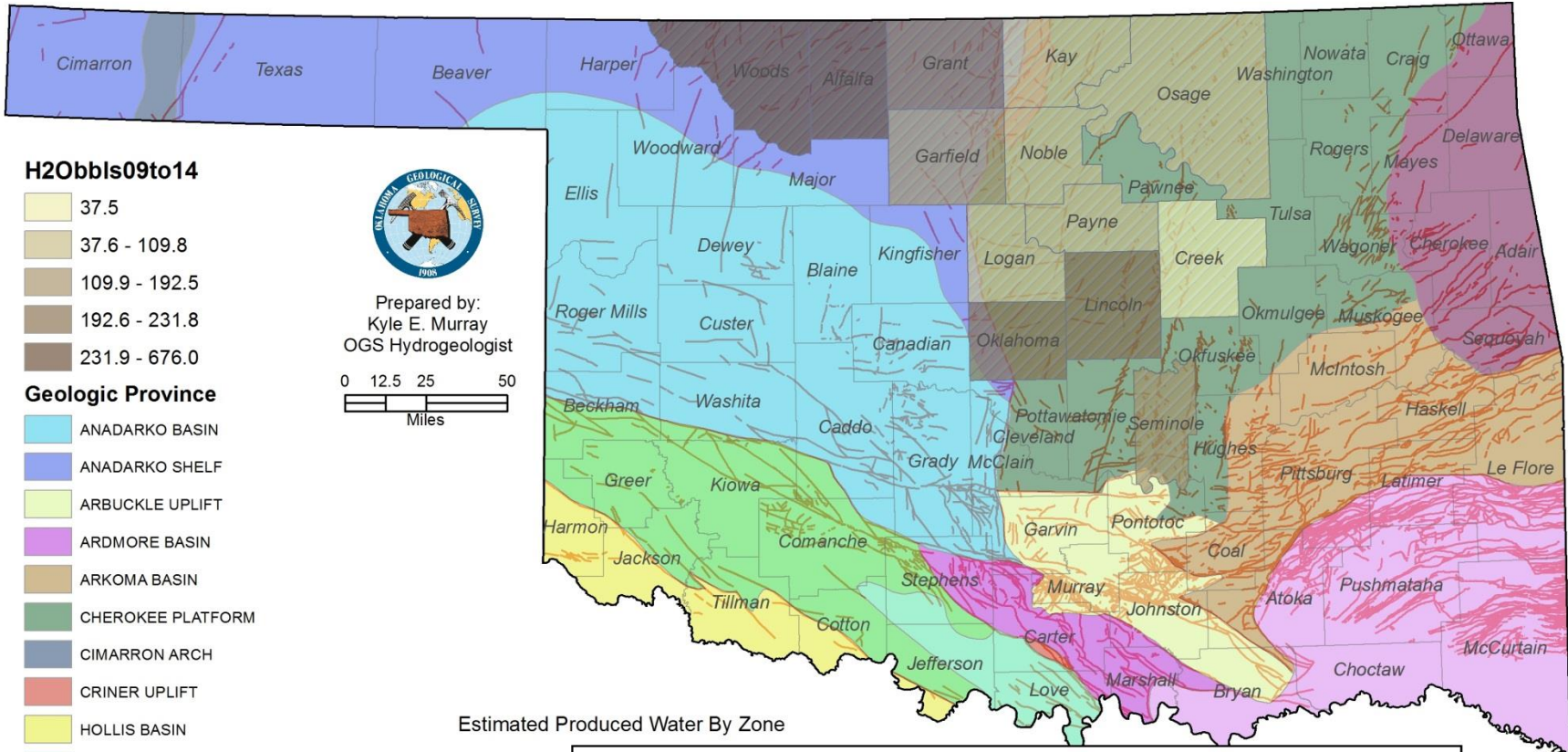
Compiled from:
Lasser Production Database

Oil Production by Zone

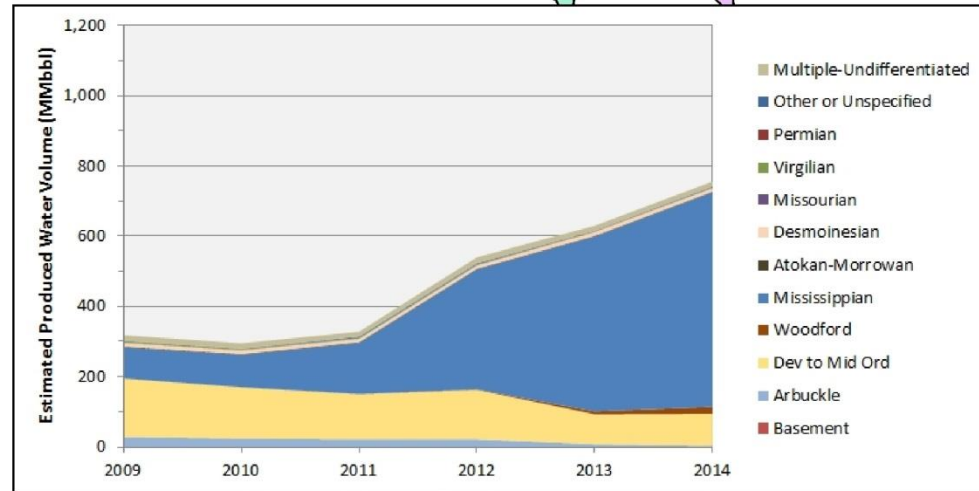


(Murray, 2015 – in preparation)

Est. H₂O Production by Zone for 13 Study Area Counties, 2009–2014

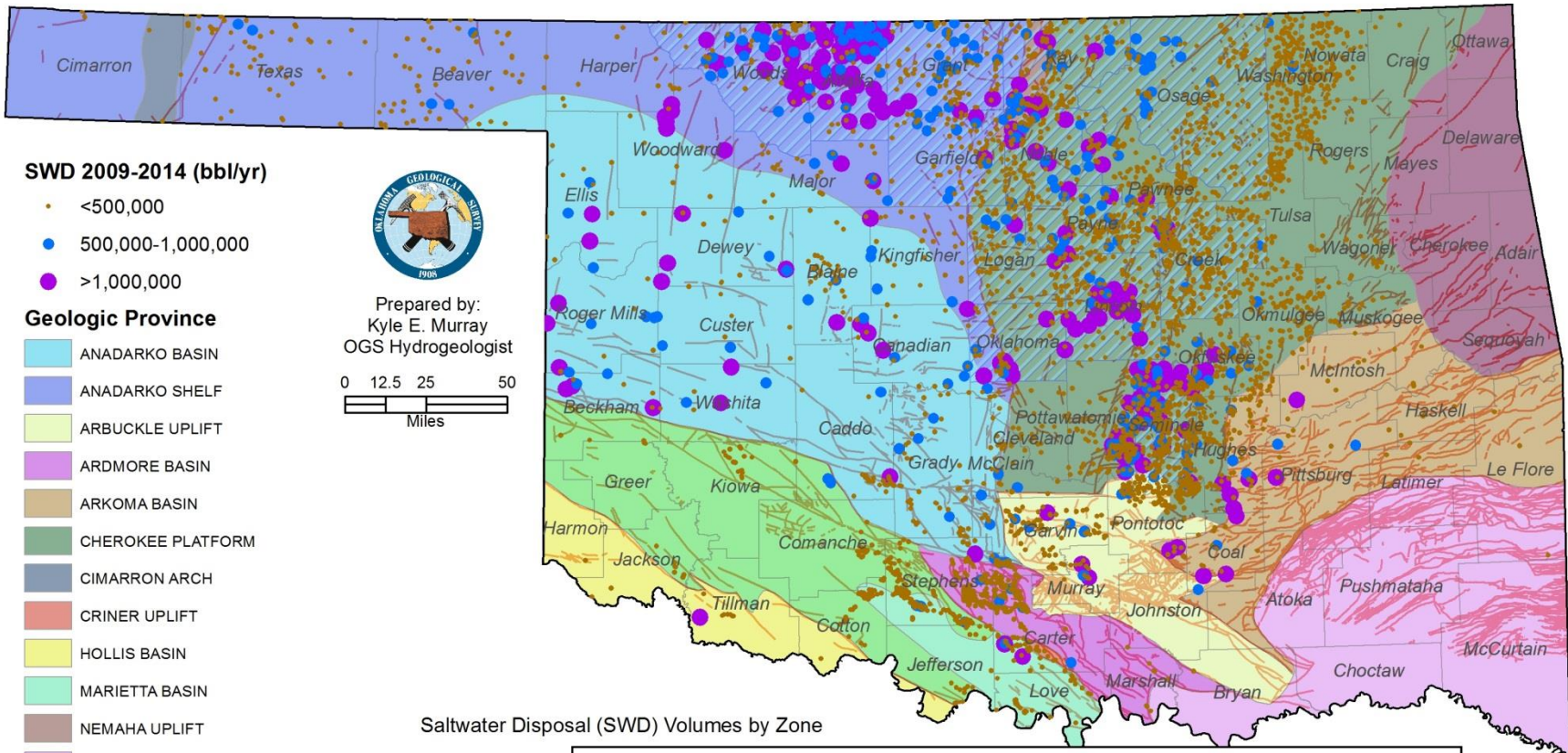


Estimated Produced Water By Zone

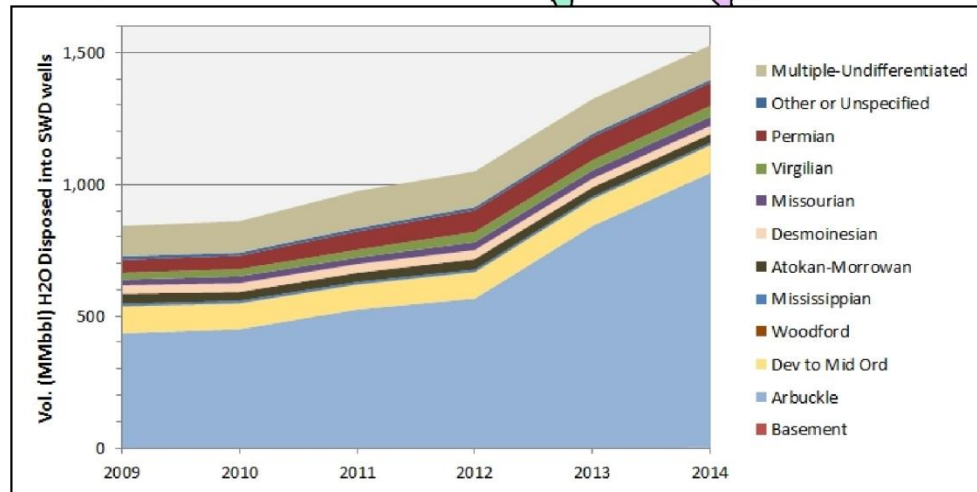


(Murray, 2015 – in preparation)

SWD in Oklahoma, 2009–2014

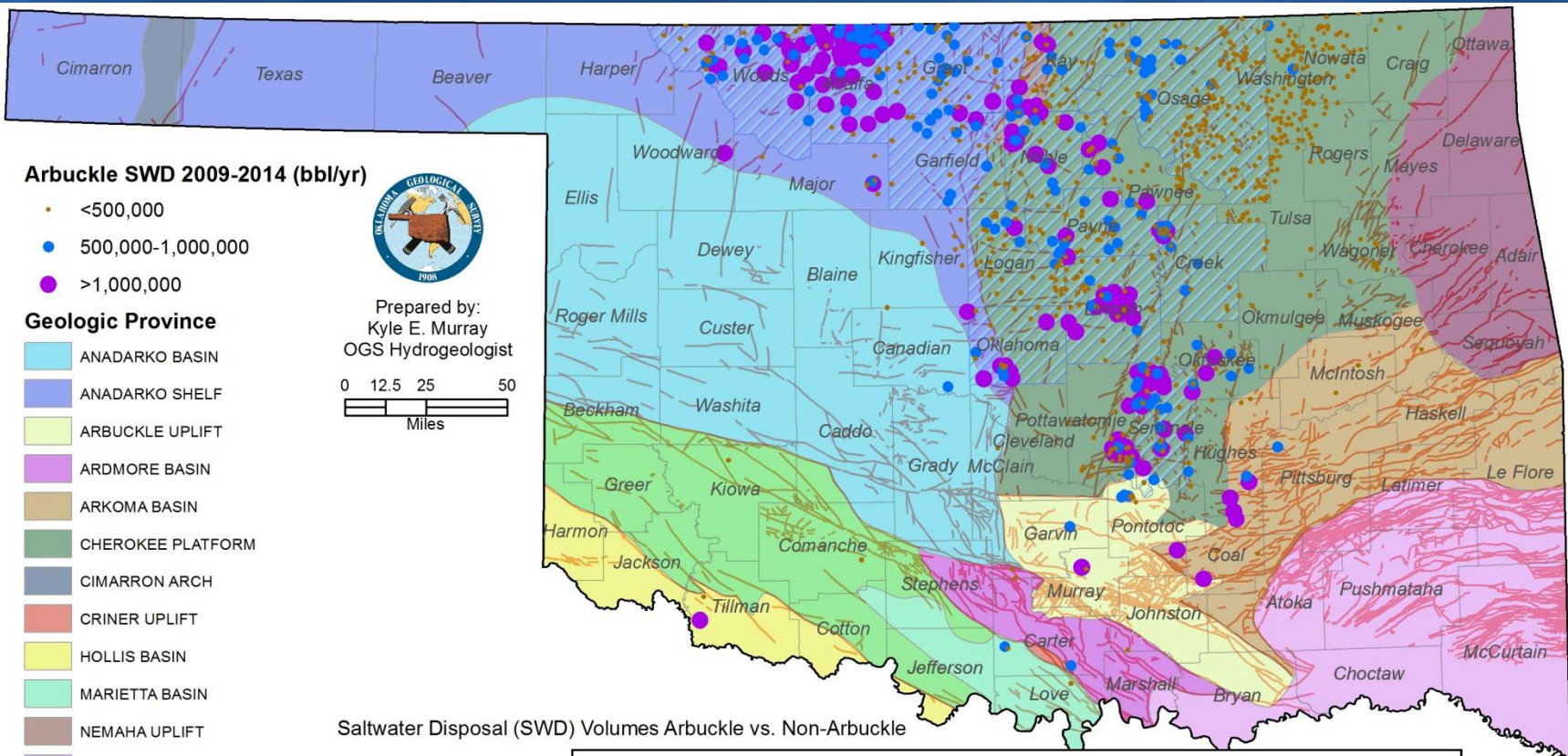


Saltwater Disposal (SWD) Volumes by Zone

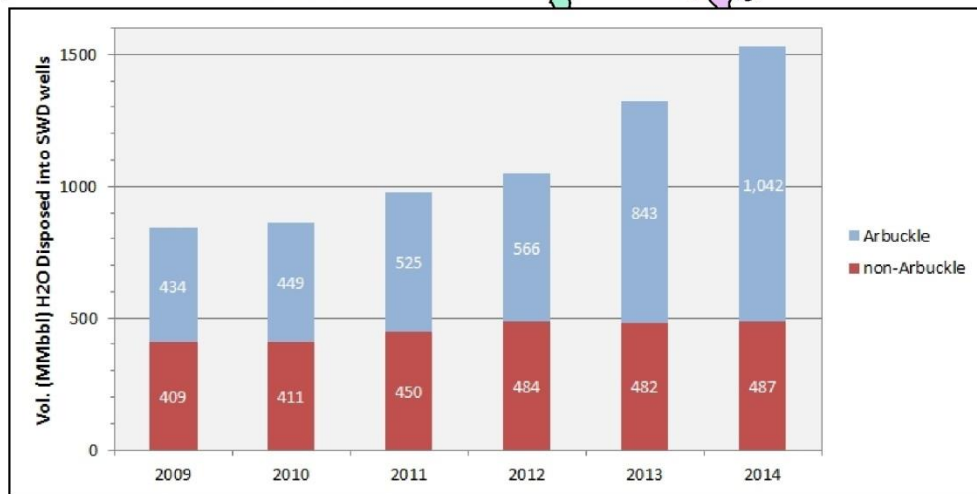


(Murray, 2015 – in preparation)

“Active” Arbuckle SWD wells in Oklahoma, 2009–2014



Saltwater Disposal (SWD) Volumes Arbuckle vs. Non-Arbuckle



(Murray, 2015 – in preparation)