

OIL & GAS SHALE DEVELOPMENT IN OHIO

A map of Ohio with county boundaries and names labeled. The map is color-coded to show areas of oil and gas shale development potential. Red areas are concentrated in the eastern part of the state, particularly in the Appalachian region. Green areas are scattered throughout the central and western parts of the state. Orange and yellow areas are also present, particularly in the western and southern regions. The colors represent different levels of potential or different types of shale resources.

J. MICHAEL BIDDISON

**DEPUTY DIRECTOR, RESOURCE CONSERVATION
OHIO DEPARTMENT OF NATURAL RESOURCES**

www.ohiodnr.com



PRESENTATION SUMMARY

- *Ohio is open for business*
- *Ohio oil & gas laws, regulations, & policies*
- *Maturation status of the Utica / Point Pleasant Shale*
- *Horizontal shale wells vs conventional vertical wells*
- *Shale development permit issues*
- *Shale development field challenges*
- *Hydraulic fracturing in Ohio*
- *Underground injection control program*
- *ODNR oil & gas leases*
- *Looking forward*



OHIO IS OPEN FOR BUSINESS

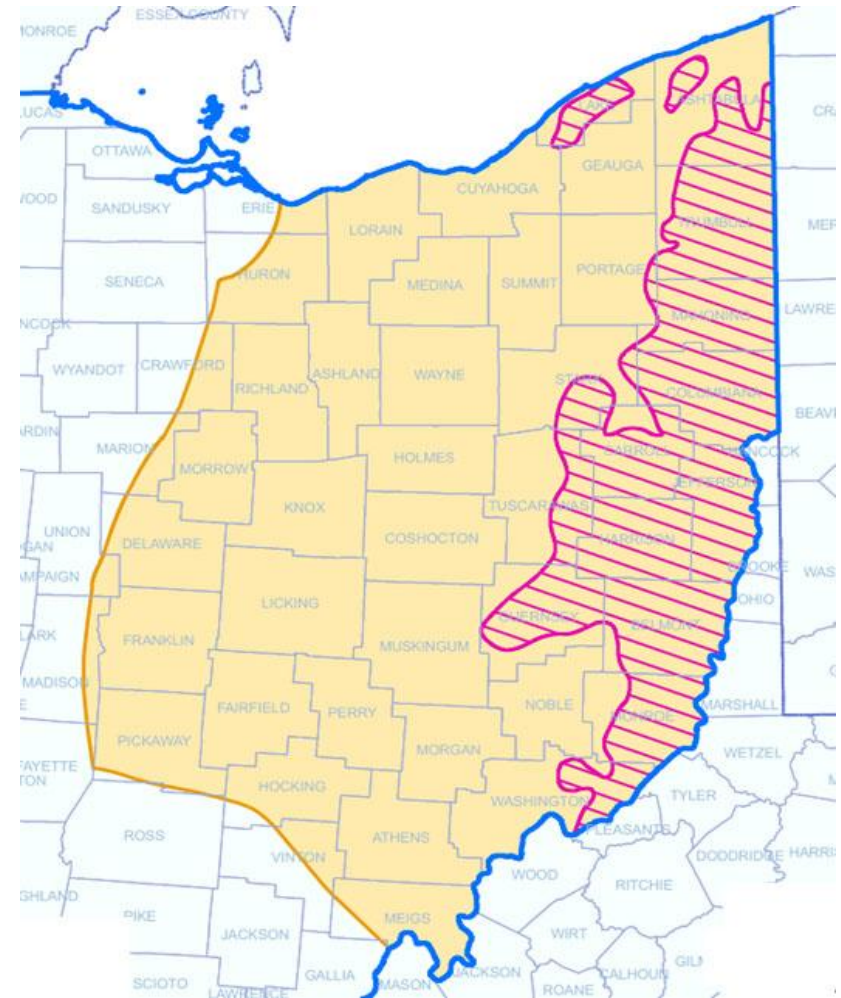


- ***Common Sense Initiative – regulatory reforms***
 - *Facilitate economic growth & job creation*
 - *Transparent & responsive*
 - *Accountable & effective*
 - *Fair, consistent, & predictable*
- ***Governor's two-day energy summit***
- ***Jobs-Ohio energy director***
- ***State & local government coordination***

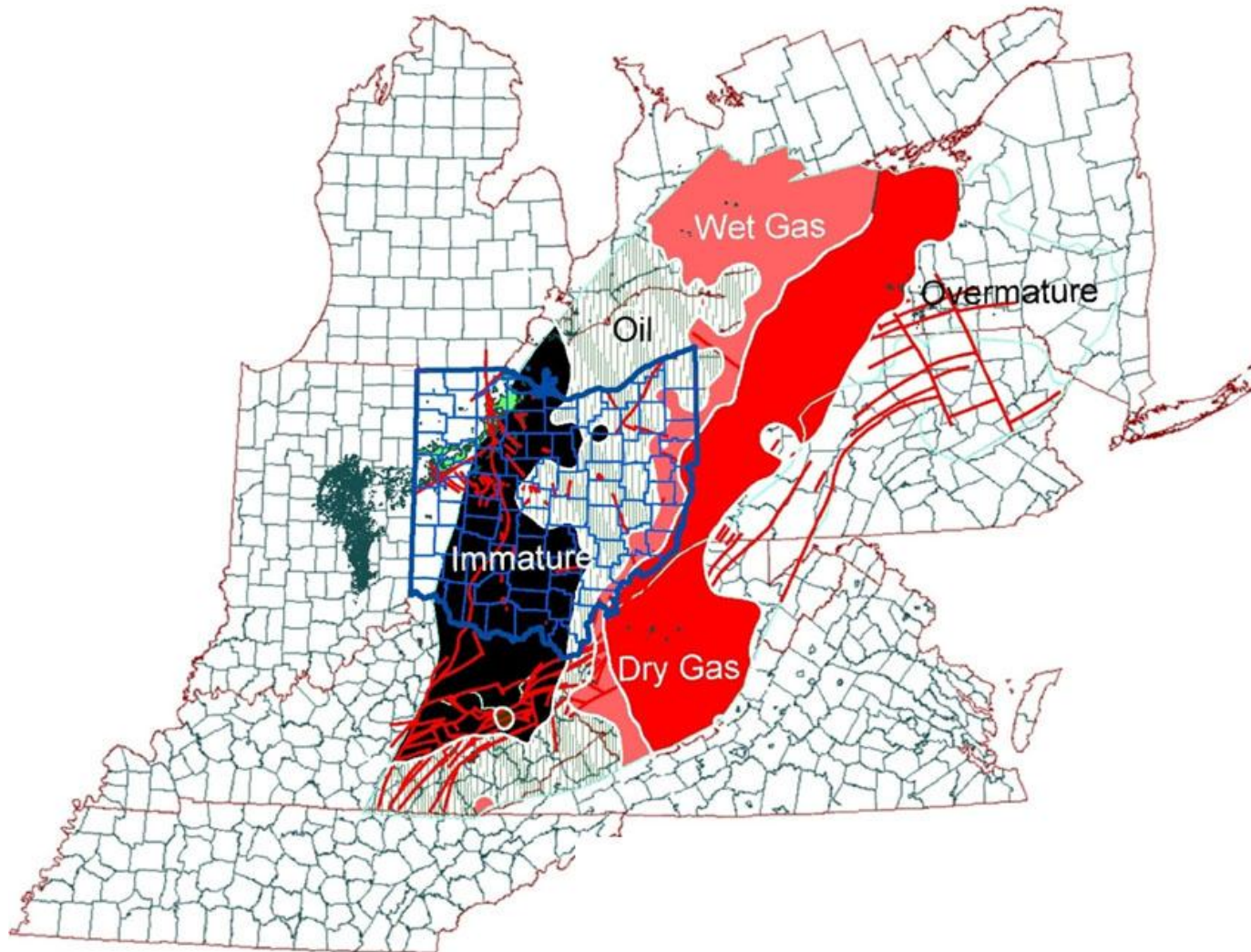
OHIO OIL & GAS LAWS, REGULATIONS, & POLICIES



- *ODNR Division of Oil & Gas Resources Management (sole & exclusive authority)*
- *Uniform statewide regulation – permitting, well locations, spacing, site construction, drilling, completions, production, restoration, & waste disposal*
- *Conservation & effective development of oil & gas resources to prevent waste*
- *Public health, safety, & environmental protection (compliance & enforcement)*
- *Idle & orphan well plugging program*
- *Underground injection control class II brine disposal program*
- *Ohio EPA draft General Air Emissions Permit for the production operations of horizontal shale wells*



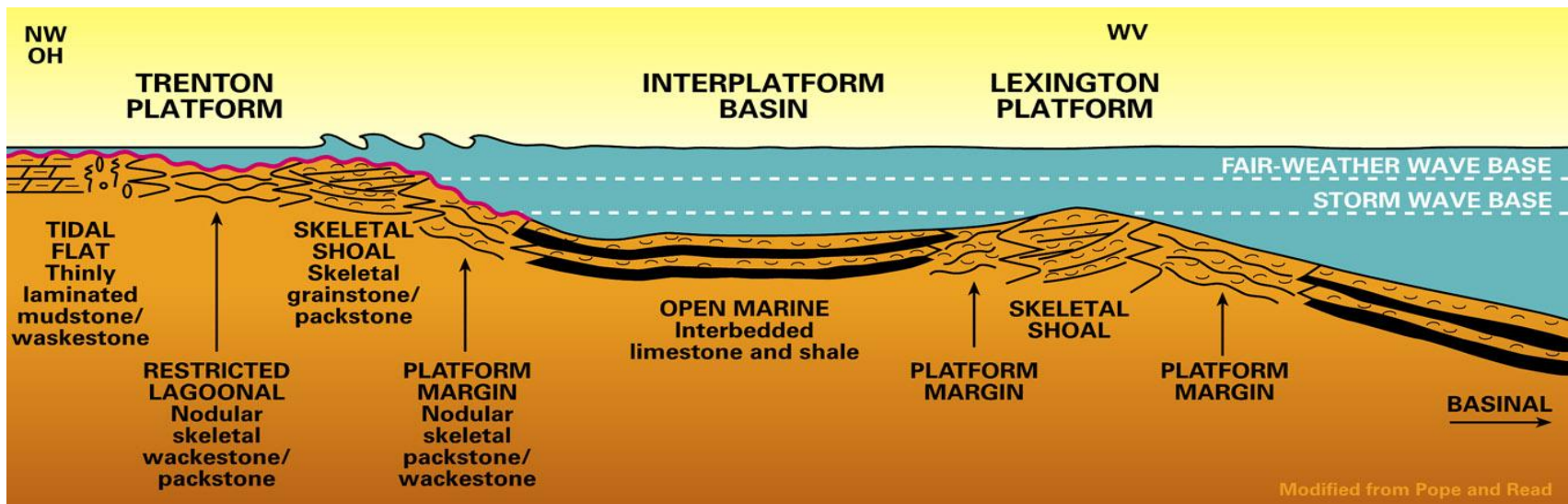
MATURATION STATUS OF THE UTICA/POINT PLEASANT SHALE



HORIZONTAL SHALE WELLS VS CONVENTIONAL VERTICAL WELLS

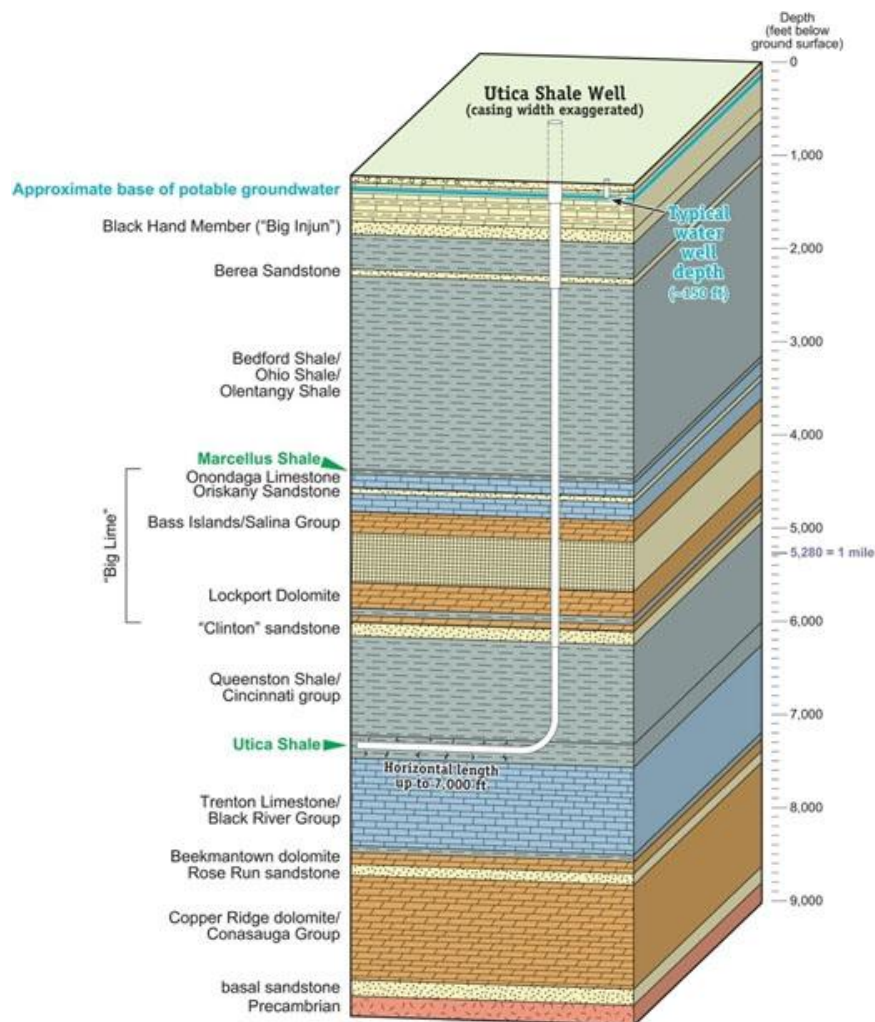


- *One month vs one week drilling operations*
- *\$8 million vs \$400 thousand investment*
- *Up to 200 acre vs 40 acre drainage area*
- *Up to 8000 feet of horizontal pay zone vs 200 feet vertical pay zone*
- *20 multiple stage frac jobs vs one frac job*
- *4 BCFe vs 300 MMCFe life of well production*
- *Organic shale sources vs sandstone & limestone hydrocarbon reservoirs*





SHALE DEVELOPMENT PERMIT ISSUES



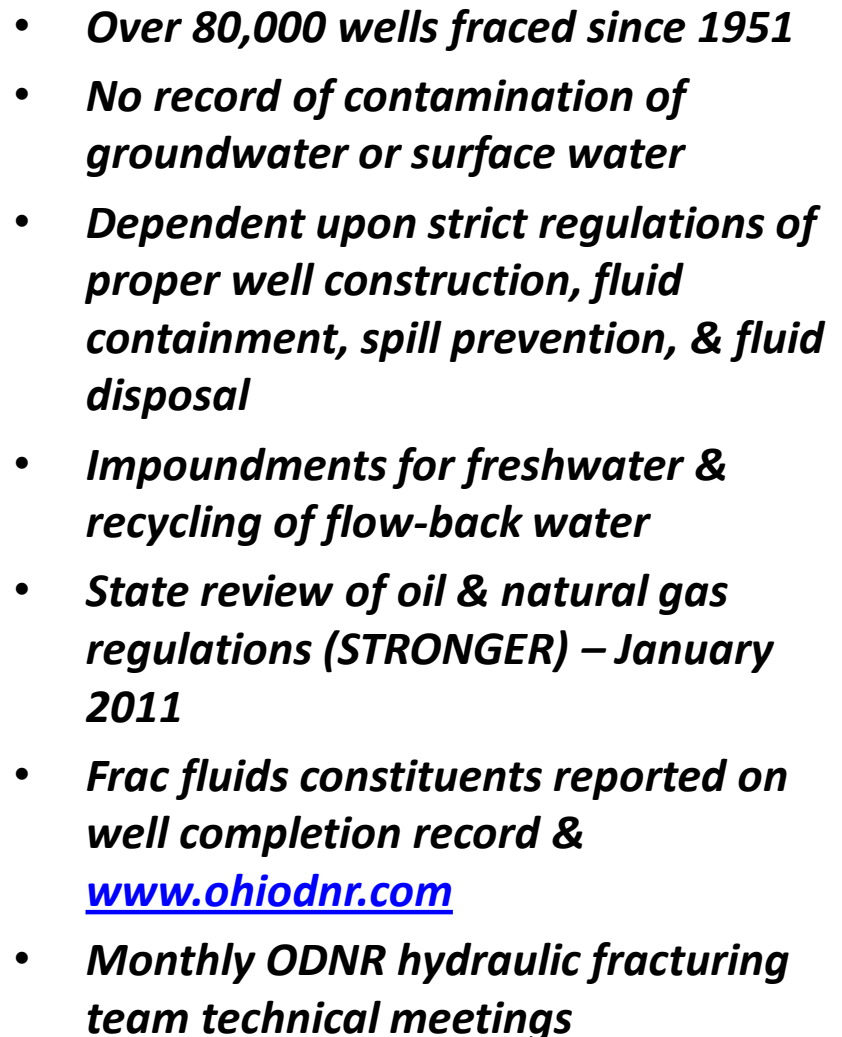
- *Well spacing & multiple wells per pad*
- *"Affected" coal mines & minerals property rights*
- *Lease unitization & mandatory pooling*
- *Surface water & water well advanced testing*
- *Spill prevention containment & control*
- *Multiple inspections of well site activities*
- *Uniform county / township road use maintenance agreement*
- *Special permit conditions to protect health, safety, & the environment*
- *Permits are not appealable*

SHALE DEVELOPMENT FIELD CHALLENGES



- *Hundreds of truckloads of equipment, materials, & supplies*
- *Closed steel drilling pits & fluid storage systems*
- *Infrastructure requirements*
 - *Midstream production operations*
 - *Gathering systems*
 - *Compression & gas processing facilities*
 - *Natural gas liquids fractionation plants*
- *Repair and rebuild new roads and bridges*
- *Emergency management response*
- *Local community collaboration*





UNDERGROUND INJECTION CONTROL PROGRAM



- *USEPA primacy established in 1983*
- *181 UIC wells permitted & operating*
- *Unannounced inspections of UIC well integrity & operations*
- *Registered, bonded, & insured brine haulers*
- *Cradle-to-grave brine pickup & disposal*
- *Brine spreading permitted on gravel roads for dust & ice control – 2%*
- *Monthly ODNR UIC team technical meetings*
- *UIC program funded by brine disposal volumes*
- *Brine includes flow-back fluids*





ODNR OIL & GAS LEASES

- *ODNR is both the landowner (Parks, Wildlife, & Forestry) & regulator (DOGRM)*
- *Best management practices – administrative & operations*
- *Standard leases with specific addendums & parcels*
- *Transparent RFP process*
- *Five-member Oil & Gas Leasing Commission oversight*
- *Non-development lease priority*
- *Approved drilling schedule*
- *Separate lease for vertical & horizontal well operations*
- *Competitive lease payments & royalty*
- *Standards for insurance, surety bonds, financial capability, operational experience, etc.*





LOOKING FORWARD

- *Ohio is oil & gas investment friendly with 150+ years of development & over 63,000 producing wells*
- *Ohio applies “lessons learned” from other states*
- *Legal & regulatory enforcement is strong & very strict – but fair, reasonable, predictable, & straightforward*
- *Over two million acres have been leased and / or joint ventures entered into for shale development (escalation in lease signing bonus & royalty percentage – up to \$4000 / acre & 18%)*
- *Only three horizontal Utica / Point Pleasant Shale wells are in production – 12 wells have been drilled – permits issued & rig count trends are rising*
- *Indications are that the Utica / Point Pleasant Shale is liquids “rich” (gas, condensate, & oil gradates up-dip from southeast to central / northwest Ohio)*
- *ODNR resource conservation divisions, state agencies, and federal agencies contribute to legal & regulatory oversight & management*

