A Water Utility's Perspective on Shale Development in Appalachia

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Agenda

- About American Water
- Water in Energy Development
- Our History with Shale Development in Appalachia
- “Shale 101”
  - Water usage / impacts
- Unique customer
- System improvement projects

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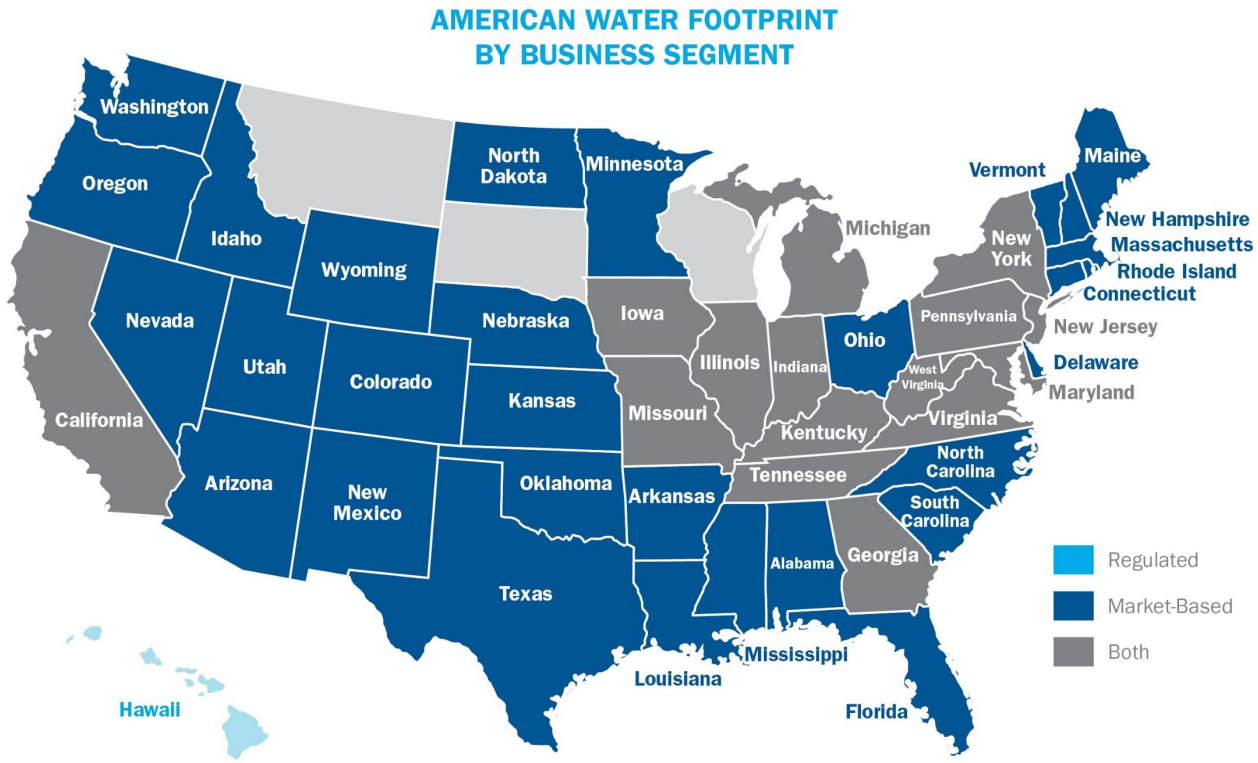
WHO WE ARE

We are the largest and most geographically diverse publicly traded water and wastewater service provider in the United States.

- We serve a broad national footprint and a strong local presence.
- We provide services to approximately **14** million people in **46** states.
- We employ **7,100** dedicated and active employees and support ongoing community support and corporate responsibility.
- We treat and deliver more than **one billion** gallons of water daily.



Water in Energy Development

Water – Energy Nexus
[Producing **energy** uses **water**, and providing **water** uses **energy]**

Energy

- **Mining Coal, Oil and Gas Extraction**
- **Power plant cooling**
- **Refining transportation fuels**
- **Renewable:**
  - **Hydroelectric**
  - **Growing crops for biofuels**
  - **T idal / wave power**
  - **Geothermal power**

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Our History with the Shale Industry

- 2009-2010 Energy companies approached us about needing water
  - …also about wanting to lease our mineral rights
  - …also about ROW access, etc.
- Unconventional drilling was new, rapidly emerging
- Formed a strategic action group (SAG) to study the industry
- Dedicated resources to support the shale customers

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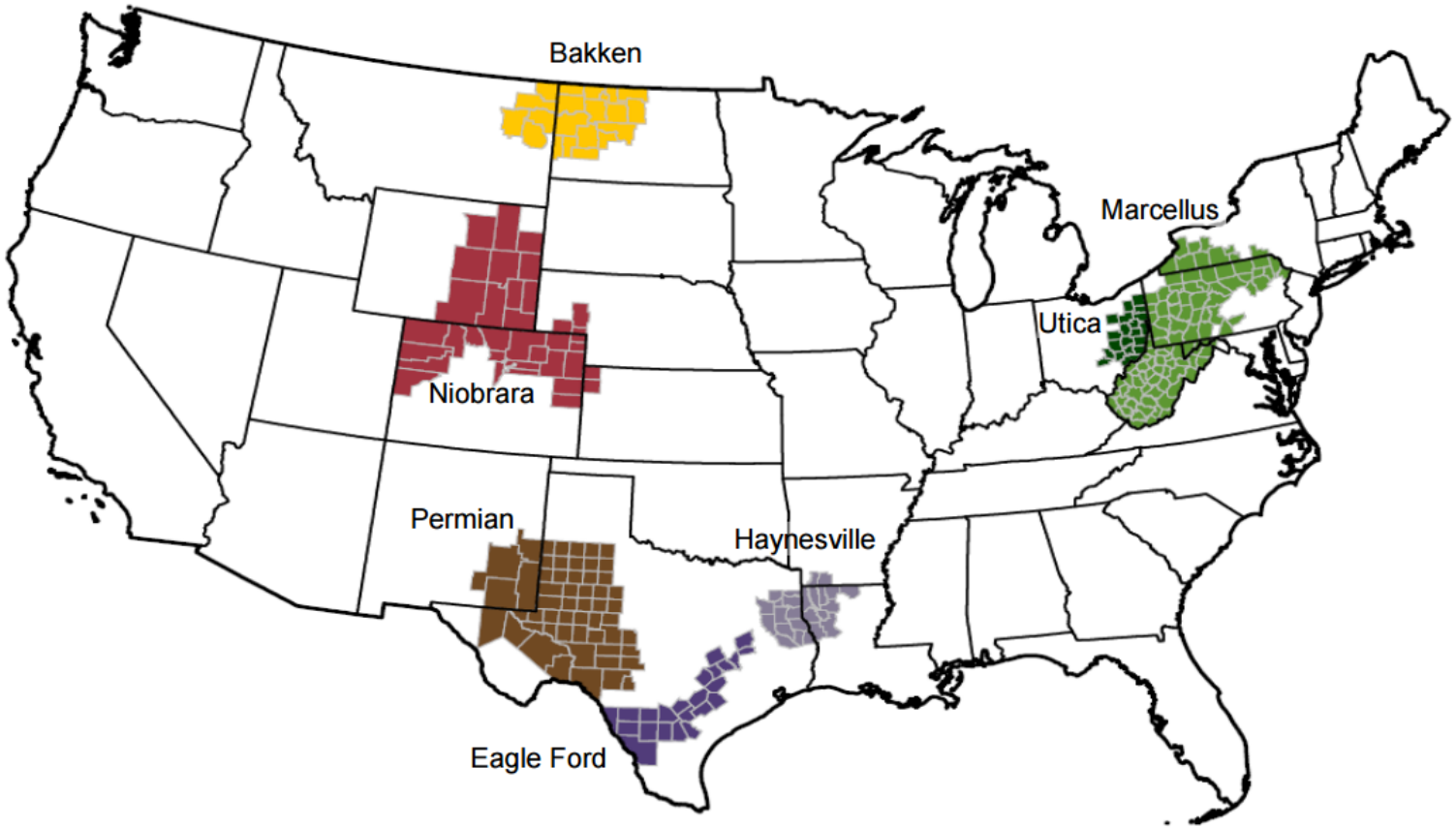
Growth Regions for oil and gas production in the U.S.

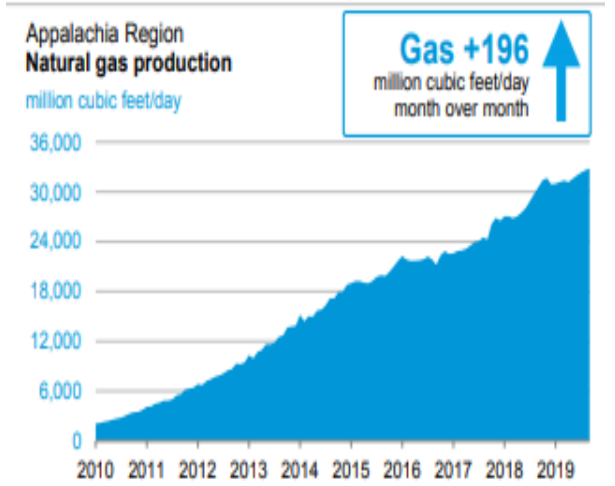


Gas Producing States

PA - #2

OH - #5

WV - #7



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Water use / impacts in the shale cycle

- Well Drilling
- Transported
  - Trucked / piped
- Hydraulic Fracking
  - Source: public systems, stream, river
- Produced Water
  - Reuse / treated / disposal
- Hydrotesting of pipelines
- Storage
  - Impoundment / tanks

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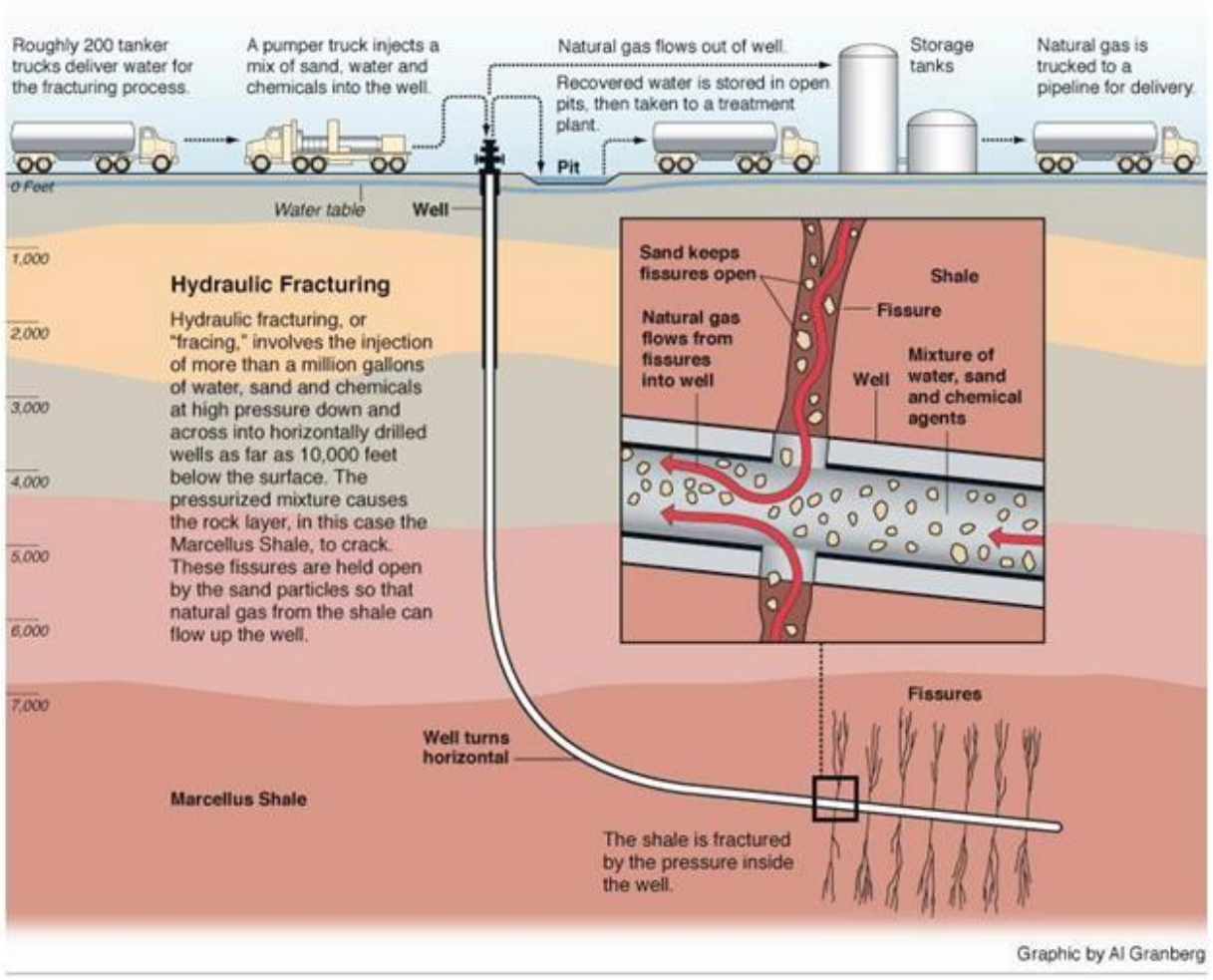
Hydraulic Fracking “101”



- During fracking, water is used to transport sand and chemicals to the fractured rock
- Water used per well has increased from 5-6 MG/well in 2012 to 18-19+MG/well in 2019
- As the well is brought on line, water comes back to the surface. Largest component (for the first month or so) is the water that was used for fracking, but the well continues to “produce” water that was in the formation

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“Shale” Customer vs. Other Industrial-type Customer

“Shale” customer	Other industrial or commercial customer
Business conditions and other factors effect water needs / dynamic	Water needs are usually stable
Locations change	Location fixed
Competition from other sources (rivers / streams / produced water)	No competition
Water is temporarily stored for operations	Water storage capacity for fire protection
Very high (instantaneous) demand requirements (1000+ gpm)	Medium to high (steady) demand requirements
Highly prefer optionality, reliability	Expect reliability (given)

Regulated Business Process for a “Shale” customer

- Inquiry for water need near a well pad
- Hydraulic analysis is performed on the system
- Commitment letter is provided or an investment is made to increase capacity or pipeline extension
- Customer applies for water management plan permit from DEP
- Vault is installed by shale customer containing backflow preventer and pressure sustaining valve
- Connection is made to the vault …customer takes water as needed
- Communication / Remote monitoring is done
- Shale customer tracks and reports daily water usage to the state

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System Improvement Projects

- Partnering with energy companies to develop “win-win” projects
- Improve system capacity and / or provide water closer to well pad
  - Benefit to customers
  - Benefit to AW
  - Benefit energy company
  - Benefit to the community (reduces truck traffic)

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AW's perspective on shale development

- Water has historically been a critical part of energy development (water-energy nexus)
- Water is an especially critical part of the shale industry
  - Sourcing / Handling / Reuse / Treatment
- Shale customers have unique requirements
  - Dynamic / high demand user / quick movers
- Success with system improvement projects
- Help to reduce water truck hauling

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THANK YOU