

# U.S. Produced Water Volumes & Management Practices in 2021

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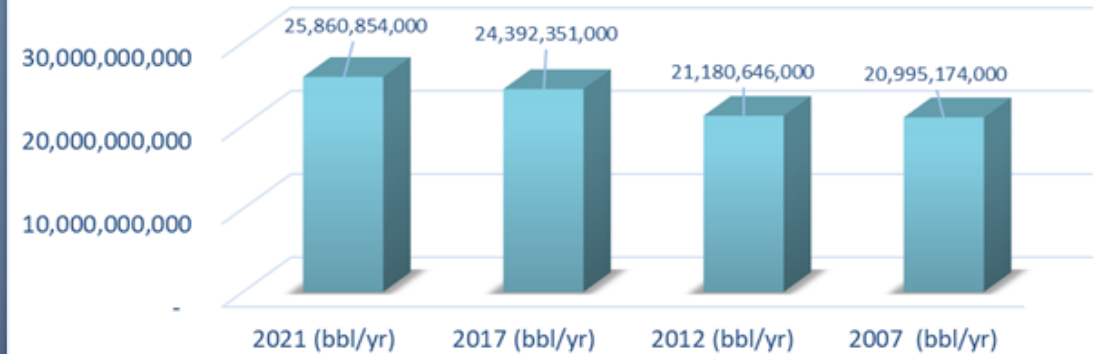
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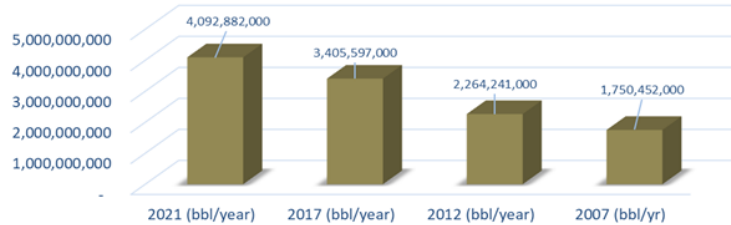
# INTRODUCTION

- Fourth edition of Produced Water Volumes and Management Practices – a publication that documents and assesses nationally produced water volumes and management practices employed by operators across various states and regions.
- The report analyzes data collected from 36 states.
- Data analyzed is based on 2021 production as reported to the states or Federal agencies via online operator reporting tools as well as in-house Risk Based Data Management (RBDMS) applications – a product of the GWPC.

**U.S. Produced Water Totals Rounded By Study Year**



**U.S. Crude Oil and Condensate Production Totals  
Rounded By Study Year**



**U.S. Natural Gas Production Totals  
Rounded By Study Year**

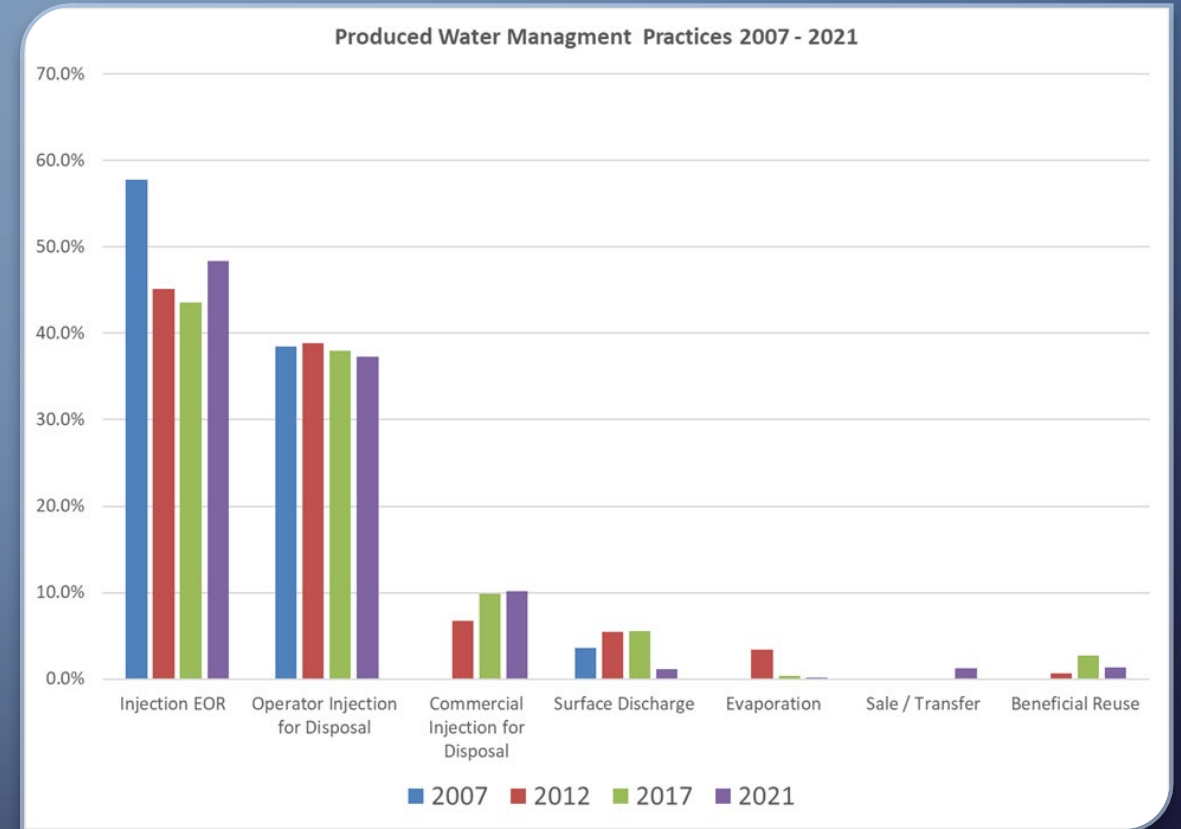


## KEY FINDINGS

- Production of crude oil (20.18%), natural gas (17.21%), and produced water (6.02%) increased between 2017 and 2021.
- Eight states reported more than 1 billion bbls of produced water in 2021 (TX, IL, CA, OK, NM, WY, AK, KS).
- ~95.74% (23,841,387,000 bbl) of the produced water was injected.
- Water reuse, especially in Texas, is on the rise and may have exceeded 2.0 billion bbls.

# OUTLINE

- Data Collection and Approach
- Data Availability and Quality
- Previous Produced Water Volume Estimates
- 2021 Produced Water Volume
  - Texas Decrease - Unreported or untracked recycling
  - Illinois Increase - Round-trip EOR injection
  - Ratio of Water to Hydrocarbon
- 2021 Produced Water Management
- State Summaries





# DATA COLLECTION AND APPROACH

State	Oil & Gas Agency	Comments
Alabama	Oil and Gas Board of Alabama	Replies to the questionnaire, CBM water to the Black Warrior River under the auspices of NPDES permits
Alaska	Alaska Oil and Gas Conservation Commission	Replied to the questionnaire.
Arizona	Arizona Oil and Gas Conservation Commission	AZOGCC replied that they did not have compiled data to complete the questionnaire. To obtain monthly production data the ADEQ Records Management Center was contacted and records were requested.
Arkansas	Arkansas Oil and Gas Commission	Replied to the questionnaire with produced water generation and management data, but used tables from 2017 questionnaire.
California	California Department of Conservation Geologic Energy Management Division - Formerly Division of Oil, Gas, and Geothermal Resources	Replied to the questionnaire.
Colorado	Colorado Oil and Gas Conservation Commission	Replied to the questionnaire.
Florida	Florida Department of Environmental Protection (FDEP) Oil and Gas Program	FDEP Oil and Gas Program website. Electronic Document Management System (OCULUS) for each of the operating fields in the state, on monthly Form 10A reports.
Georgia	Georgia DNR	Received email explaining that there is NO PRODUCTION either onshore or offshore in Georgia
Idaho	Idaho Department of Lands, Oil and Gas Division	Replied to the questionnaire.
Illinois	Illinois Department of Natural Resources, Office of Oil and Gas Resource Management	Replied to the questionnaire.
Indiana	Indiana Department of Natural Resources Division of Oil and Gas	Replies to the questionnaire
Kansas	Kansas Corporation Commission - Conservation Division	Replies to the questionnaire
Kentucky	Kentucky Department of Natural Resources Division of Oil and Gas	Replied to the questionnaire.
Louisiana	Louisiana Department of Natural Resources Office of Conservation	Replied to the questionnaire and provided link to online databases (SONRIS) with access permission for oil and gas and produced water data.
Maryland	Maryland Department of the Environment - Land and Materials Administration - Mining Program	Replied to Questionnaire with hydrocarbon production data only.
Michigan	Michigan Department of Environment, Great Lakes, and Energy - Oil, Gas, and Minerals Division	Could not reply to the questionnaire provided, production data obtained from EIA.
Mississippi	Mississippi State Oil and Gas Board	Replied to the questionnaire provided produced water generation and management information.
Missouri	Missouri Department of Natural Resources and Missouri Geological Survey	Replied to questionnaire with produced water generation and management information.
Montana	Montana DNR - Board of Oil and Gas Conservation	Replied to the questionnaire and provided produced water generation, crude oil and natural gas data as well as water management information.

- **Same Approach as Previous Reports**
  - Email Requests sent to 36 State Agencies
    - Introductory letter from GWPC Executive Director
    - Modified Questionnaire
    - Excel Spreadsheet summary and conversion formulas embedded
  - Online Research to Obtain Data from Federal Agencies
  - Data less than 1-year old

# DATA COLLECTION AND APPROACH

- Beneficial Reuse

- Water treatment technology innovations and restrictions on PW disposal revived reuse
- Limited by the complex nature of PW and rural location
- Breakthrough - frac-fluids capable of using water with higher TDS – Slick Water
- Outside industry use is limited to agricultural irrigation in California during drought seasons, and dust and ice control on roads
- Fit-for-purpose research is needed to expand the use of treated PW

Management Practice	Total Volume of Produced Water Managed by That Practice (bbl/year)	Percentage of Produced Water Managed by That Practice
Injection for Enhanced Recovery	4,180,191.31	48.63%
Injection for Disposal (By Operator)	2,743,752	31.92%
Injection for Disposal (Commercial / Offsite) (Paid 3 <sup>rd</sup> Party to Manage Produced Water)	554,689	6.45%
Surface Water Discharge (Ocean, Lake, Pond, Stream)	0	0.00%
Surface Discharge (Land Application)	0	0.00%
Evaporation (Lined Sump)	Unknown	0.00%
Evaporation / Infiltration (Unlined Sump)	0	0%
Sale / Transfer – Domestic Use	100,000	1.16%
Sale / Transfer – Other Oil & Gas Operator	758,734	8.83%
Reuse Within the Oil & Gas Industry (By Operator for Drilling, Well Work, Well Stimulation, Other Facility Use)	256,886	2.99%%
Reuse Outside the Oil & Gas Industry (Please Specify, e.g., Domestic Sewer, Irrigation, Cooling water, Dust Suppression, etc.)	1,425 - Dust Suppression	0.02%
Other	0	0.00%



The background of the slide is a complex, abstract composition. It features a network of white circuit-like lines with circular nodes, overlaid on a dark blue gradient. In the lower-left, there are horizontal bars in shades of blue and orange. The upper-right portion contains faint, semi-transparent images of data tables and line graphs. One table shows numerical data with headers like '200.40', '341.54', '195.25', '191'. Another table shows a sequence of numbers from 1 to 25. A line graph with a jagged, fluctuating line is also visible. The overall aesthetic is technical and data-driven.

# DATA AVAILABILITY AND QUALITY

- State to State Variations
- Water production and injection tracked by 26 states via a questionnaire
  - Injection volume represented the total amount injected, as commercial vs. operator is not tracked consistently
- Six states with online data access provided
- Four states with no production
- EIA data used for one state
- Federal agency data online
- Few assumptions or extrapolations
- Assumptions, data sets, and analyses used to develop the estimates are described separately for each state

# PREVIOUS PRODUCED WATER VOLUME ESTIMATES

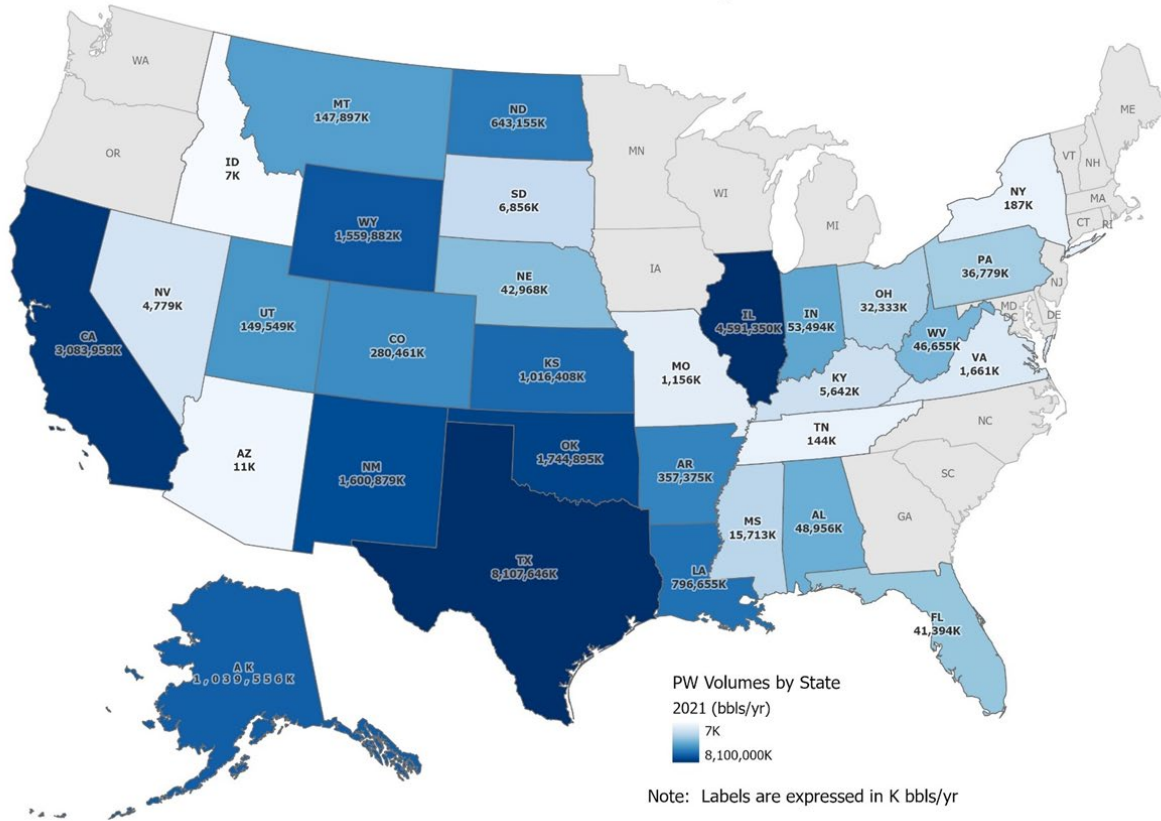
- 2021 vs. 2017 – 6.02%
- 2017 vs. 2012 – 15.16%
- 2012 vs. 2007 - <1%
- This same pattern of oil and gas volumes increasing faster than water volumes was observed in 2017 and 2012.
- The percentage increase in produced water as compared to the increase in crude oil appears to have remained consistent with a near 3.3-fold relationship in their percent increases.

State / Federal	2021 (bbl/yr)	2017 (bbl/yr)	2012 (bbl/yr)	2007 (bbl/yr)
Alabama	48,956,492	63,870,227	106,619,000	119,004,000
Alaska	1,039,555,842	828,067,983	769,153,000	801,336,000
Arizona	10,715	38,786	81,000	68,000
Arkansas	357,375,154	315,958,569	184,867,000	166,011,000
California	3,083,959,386	3,134,503,023	3,074,585,000	2,552,194,000
Colorado	280,460,737	310,650,278	358,389,000	383,846,000
Florida	41,393,747	58,673,032	62,641,000	50,296,000
Idaho	7,314	91,566.00	-	-
Illinois <sup>1</sup>	4,591,349,632	282,599,989	99,142,000	136,872,000
Indiana	53,494,095	50,797,713	57,566,000	40,200,000
Kansas	1,016,408,380	1,205,091,949	1,061,019,000	1,244,329,000
Kentucky	5,642,263	13,913,894	19,689,000	24,607,000
Louisiana	796,655,259	998,519,062	927,635,000	1,149,643,000
Maryland	No Data	No Data	No Data	No Data
Michigan	No Data	80,500,000	117,000,000	114,580,000
Mississippi	15,712,999	171,145,175	231,236,000	330,730,000
Missouri	1,156,481	2,763,613	2,103,000	1,613,000
Montana	147,897,041	141,733,134	182,833,000	182,266,000
Nebraska	42,968,415	50,069,495	58,641,000	49,312,000
Nevada	4,779,403	6,510,029	5,865,000	6,785,000
New Mexico	1,600,878,600	879,740,841	775,930,000	665,685,000
New York	186,637	189,746	510,000	649,000
North Dakota	643,154,596	505,828,554	291,147,000	134,991,000
Ohio	32,332,672	24,142,988	5,542,000	6,940,000
Oklahoma	1,744,894,591	2,844,485,617	2,325,153,000	2,195,180,000
Pennsylvania	36,779,077	55,321,026	34,089,000	3,912,000
South Dakota	6,855,975	6,924,285	5,296,000	4,186,000
Tennessee	No data	44,163	1,480,000	2,263,000
Texas	8,107,645,550	9,895,084,619	7,435,659,000	7,376,913,000
Utah	149,548,608	155,047,940	166,945,000	148,579,000
Virginia	1,660,599	2,156,931	3,232,000	1,562,000
West Virginia	46,654,984	26,650,935	13,772,000	8,337,000
Wyoming	1,559,881,944	1,705,309,511	2,178,065,000	2,355,671,000
<b>State Total</b>	<b>25,458,257,188</b>	<b>23,816,424,673</b>	<b>20,555,884,000</b>	<b>20,258,560,000</b>
<b>Federal Offshore</b>	<b>402,597,272</b>	<b>575,926,287</b>	<b>624,762,000</b>	<b>587,353,000</b>
<b>Tribal Lands</b>	<b>No Data</b>	<b>No Data</b>	<b>No Data</b>	<b>149,261,000</b>
<b>Federal Total</b>	<b>402,597,272</b>	<b>575,926,287</b>	<b>624,762,000</b>	<b>736,614,000</b>
<b>U.S. Total Rounded</b>	<b>25,860,854,000</b>	<b>24,392,351,000</b>	<b>21,180,646,000</b>	<b>20,995,174,000</b>
Notes: 1 - Extrapolated				



# 2021 PRODUCED WATER VOLUME

Produced Water Volumes by State 2021



2021 Rank	State	Volume (bbl/yr)	Percent of Total	2017 Rank	2012 Rank
1	Texas	8,107,645,550	31.4%	1	1
2	Illinois	4,591,349,632	17.8%	13	18
3	California	3,083,959,386	11.9%	2	2
4	Oklahoma	1,744,894,591	6.7%	3	3
5	New Mexico	1,600,878,600	6.2%	7	7
6	Wyoming	1,559,881,944	6.0%	4	4
7	Alaska	1,039,555,842	4.0%	8	8
8	Kansas	1,016,408,380	3.9%	5	5
9	Louisiana	796,655,259	3.1%	6	6
10	North Dakota	643,154,596	2.5%	10	11

- Texas retains the top spot
- Illinois leaps forward
- 8 states over 1 billion bbls
- Federal Offshore drops
- Others adjusted but are consistent

# TEXAS DECREASE – UNREPORTED OR UNTRACKED RECYCLING

- Permian Basin exploration sharply increased affecting Texas and New Mexico
- Reduction in PW in Texas (-18.06%) vs. the increase in both crude oil & natural gas
- RRC does not require PW to be reported, PW total is an approximation based on the reported injection statewide
- The reduction in injection volume or the difference between the 2017 and 2021 PW total (1,787,439,000 bbls) was not injected
- *“Beneficial Use of Produced Water in Texas: Challenges, Opportunities and the Path Forward”* as prepared by the Texas Produced Water Consortium, mentions 1,170,000,000 bbls that was reused by the industry for hydraulic fracturing in the Permian Delaware and Permian Midland basins alone
- Other unreported or untracked recycling in other Texas basins

New Mexico	2021	2017	Difference	Percentage
Crude Oil (bbl/yr)	451,085,590	172,587,378	278,498,212	161.37%
Natural Gas (Mmcft/yr)	2,421,424	1,296,990	1,124,434	86.70%
Produced Water (bbl/yr)	1,600,878,600	879,740,841	721,137,759	81.97%
Texas				
Crude Oil (bbl/yr)	1,724,402,106	1,271,143,548	453,258,558	35.66%
Natural Gas (Mmcft/yr)	10,741,016	8,124,096	2,616,920	32.21%
Produced Water (bbl/yr)	8,107,645,550	9,895,084,619	(1,787,439,069)	-18.06%

# ILLINOIS INCREASE – ROUND-TRIP EOR INJECTION

Management Practice	2021 Reported (bbl/yr)	2021 Extrapolated (bbl/yr)	2019 (bbl/yr)	Revised 2017 (bbl/year)
Injection for Enhanced Recovery	1,105,614,565.00	3,624,249,956.36	3,315,601,965.00	2,999,759,910.00
Injection for Disposal (By Operator)	295,023,660.00	967,099,675.36	1,140,784,505.00	1,291,003,905.00
<b>Total</b>	<b>1,400,638,225.00</b>	<b>4,591,349,631.72</b>	<b>4,456,386,470.00</b>	<b>4,290,763,815.00</b>
Number of EOR Wells Reporting	1594	~5225	5530	5474
Number of Injection Disposal Wells	305	~1000	704	884
Percent of UIC Wells Reporting	30.50%	N/A	~100%	~100%

- Illinois DNR Office of Oil and Gas Resource Management provided revised 2017 data and new 2019 data that reflected injection volumes from nearly 100% of all UIC wells
- Illinois reported the volumes of PW used for EOR and disposal injection for ~30.5% of their injection wells for 2021
- 2021 data was extrapolated based on the number of wells and appears in line with their new 2019 and revised 2017 data
- Accounting for EOR volumes creates the possibility for elevated volumes due to the round-trip nature of EOR injection



# RATIO OF WATER TO HYDROCARBON

- The WORs and WGRs calculated represent the average ratio of water and hydrocarbons in the fluids produced to the surface and do not depict the true fluid proportions in the reservoirs
- Limited Data Set
  - 21 states provided water volumes from oil wells
  - 19 states provided water volumes from gas wells
  - Conventional versus unconventional WOR and WGR for states were the data allowed (7 WOR, 8 WGR)
- Calculated weighted average WOR or WGR

State	Oil 2021 (bbl/year)	Condensate (bbl /year)	Water from Oil 2021 (bbl/year)	WOR 2021
Alabama	3,544,505	719,838	24,657,894	5.8
Alaska	159,622,902	-	932,498,310	5.8
Arizona	6,379	-	10,715	1.7
Arkansas	4,211,260	-	349,429,494	83.0
California	137,117,236	-	3,051,577,137	22.3
Colorado	153,495,589	-	190,813,691	1.2
Indiana	1,521,075	-	49,026,609	32.2
Mississippi	12,931,012	-	13,673,796	1.1
Missouri	59,579	-	1,156,481	19.4
Montana	18,920,372	-	132,908,984	7.0
Nebraska	1,705,559	-	41,568,415	24.4
Nevada	223,233	-	4,779,403	21.4
New Mexico	451,085,590	-	181,651,249	0.4
New York	265,592	-	140,920	0.5
North Dakota	405,127,827	-	643,133,441	1.6
Ohio	18,777,412	-	4,348,742	0.2
Pennsylvania	863,098	5,396,909	319,351	0.1
South Dakota	1,028,395	-	6,855,702	6.7
Texas	1,459,827,134	264,574,972	8,107,646,550	4.7
West Virginia	17,961,149	-	470,688	0.0
Wyoming	78,900,632	6,389,501	1,287,690,676	15.1
Totals / Weighted Average WOR	2,927,195,530	277,081,220	15,024,358,248	4.7

# RATIO OF WATER TO HYDROCARBON

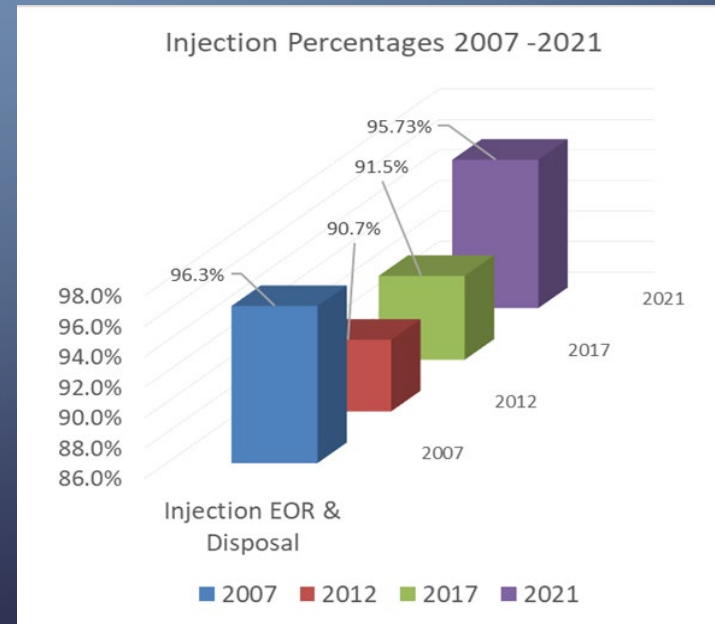
State	Gas 2021 (Mmcf)	Water from Gas 2021 (bbl/year)	WGR 2021
Alabama	107,818	23,970,080	222.3
Alaska	3,505,248	71,118,823	20.3
Arkansas	447,881	7,945,660	17.7
California	121,534	32,382,249	266.4
Colorado	1,956,843	89,647,046	45.8
Idaho	1,359	7,314	5.4
Indiana	4,136	4,467,486	1080.3
Mississippi	27,028	2,039,203	75.4
Montana	41,823	911,945	21.8
Nebraska	321	1,400,000	4362.1
New Mexico	2,421,424	419,227,351	173.1
New York	9,735	45,717	4.7
North Dakota	1,075,358	21,155	0.02
Ohio	2,256,484	27,983,930	12.4
Pennsylvania	7,656,814	36,162,901	4.7
South Dakota	3,353	273	0.1
Virginia	96,044	1,660,599	17.3
West Virginia	2,675,208	42,063,360	15.7
Wyoming	1,081,393	272,191,268	251.7
Totals / Weighted Average WOR	23,489,803.93	1,033,246,359.61	44.0

State	Conventional Oil (bbl/year)	Unconventional Oil (bbl /year)	Water From Conventional Oil Wells (bbl/year)	Water from Unconventional Oil Wells (bbl/year)	Conventional WOR	Unconventional WOR
Colorado	7,517,958	145,977,631	124,023,603	66,790,088	16.50	0.5
Mississippi	12,344,707	586,305	12,847,991	825,805	1.04	1.4
Montana	8,713,695	10,206,677	118,386,245	14,522,739	13.59	1.4
North Dakota	11,571,847	393,555,980	132,996,244	510,137,197	11.49	1.3
Ohio	2,385,245	16,392,167	1,528,280	2,820,462	0.64	0.2
Pennsylvania	781,452	5,478,556	609,939	6,237	0.78	0.001
Wyoming	30,217,384	55,072,749	1,159,342,111	128,348,565	38.37	2.3
Totals / Weighted Average WOR	73,532,288	627,270,065	1,549,734,413	723,451,093	21.08	1.15

State	Conventional Gas (Mmcf/year)	Unconventional Gas (Mmcf/year)	Water from Conventional Wells (bbl/year)	Water from Unconventional Wells (bbl/year)	WGR Conventional	WGR Unconventional
Alabama	65,769	42,049	1,161,783	22,808,297	17.7	542.4
Arkansas	66,939	380,942	727,851	7,217,809	10.9	18.9
Colorado	837,830	1,119,013	80,844,773	8,802,273	96.5	7.9
Mississippi	26,440,674	587,351	2,024,960	14,243	0.1	0.024
Ohio	35,106	2,221,378	986,388	26,997,542	28.1	12.2
Pennsylvania	82,346	7,574,469	228,841	35,934,060	2.8	4.7
Virginia	15,449	80,595	10,085	1,650,514	0.7	20.5
Wyoming	1,077,926	3,467	228,909,681	43,281,587	212.4	12483.9
Totals / Weighted Average WOR	28,622,039.79	12,009,263.99	314,894,362.00	146,706,325.00	11.00	12.22

# 2021 PRODUCED WATER MANAGEMENT

- ~95.74% Injected
  - ~48.3% EOR
  - ~37.3% Operator Disposal
  - ~10.1% Commercial Disposal
- ~1.2% Discharged
  - ~1.15% to water bodies
  - ~0.02% to land surfaces
- ~0.2% Evaporated
  - ~0.06% Lined Impoundments
  - ~0.1% Unlined Impoundments
- ~1.2% Reused sold or transferred (CA)
  - ~1.1% Domestic Reuse
  - ~0.1% Other Oil and Gas Operators
- ~1.4% Beneficially Reused
  - ~1.3% Reuse in the oil field
  - ~0.05% Reuse outside the oil field
- ~0.4% “OTHER” (Spilled, Unaccounted for, Record Errors, or Differences in Produced vs. Management)





# 2021 PRODUCED WATER MANAGEMENT

State	Injection EOR	Injection for Disposal by Operator	Injection for Disposal Commercial	Surface Discharge into Water Bodies	Surface Discharge onto Land	Evaporation in Lined Impoundments	Evaporation in Unlined Impoundments	Sale / Transfer Domestic	Sale / Transfer to Other O&G Operator	Beneficial Reuse in Oil Field	Beneficial Reuse Outside Oil Field	Other	Total Produced Water Managed
Alabama	684,985	25,463,210	-	22,808,297	-	-	-	-	-	-	-	-	48,956,492
Alaska	1,238,583,110	108,393,846	-	-	-	-	-	-	-	-	-	-	1,346,976,956
Arizona	10,701	-	-	-	-	-	-	-	-	-	-	-	10,701
Arkansas	37,706,664	319,668,490	1,082,421	-	-	-	-	-	-	-	-	-	358,457,575
California	1,540,731,145	487,399,151	-	2,369,726	3,800,378	2,246,605	23,393,231	265,760,348	30,745,992	59,263,489	7,792,195	58,608,634	2,482,110,894
Colorado	87,244,195	157,335,767	4,509,244	13,476,468	-	-	9,672	-	-	19,606,106	-	-	282,181,452
Florida	35,033,182	6,360,565	-	-	-	-	-	-	-	-	-	-	41,393,747
Idaho	-	-	-	-	-	7,314	-	-	-	-	-	-	7,314
Illinois	3,624,249,956	967,099,675	-	-	-	-	-	-	-	-	-	-	4,591,349,631
Indiana	38,651,684	14,842,411	-	-	-	-	-	-	-	-	-	-	53,494,095
Kansas	256,249,232	760,157,395	1,753	-	-	-	-	-	-	-	-	-	1,016,408,380
Kentucky	5,383,959	258,304	-	-	-	-	-	-	-	-	-	-	5,642,263
Louisiana	48,292,239	704,851,022	43,511,998	-	-	-	-	-	-	-	-	-	796,655,259
Mississippi	31,834,517	114,265,647	-	-	-	-	-	-	-	-	-	-	146,100,164
Missouri	1,065,749	90,732	-	-	-	-	-	-	-	-	-	-	1,156,481
Montana	79,072,420	51,885,041	-	-	-	10,805,134	-	-	-	-	-	6,134,446	147,897,041
Nebraska	23,312,800	23,798,500	112,000	29,615	-	12,000	1,300,000	-	-	-	3,500	-	48,568,415
Nevada	24,897	4,813,446	-	-	-	-	-	-	-	-	-	-	4,838,343
New Mexico	unknown	717,435,541	-	-	-	1,762,644	-	-	-	181,970,412	-	29,225	901,197,822
New York	17,255	6,913	63,668	53	7,826	210	37	-	-	644	90,031	-	186,637
North Dakota	110,377,405	264,960,745	262,672,129	-	-	-	-	-	-	-	-	-	638,010,279
Ohio	397,235	35,036,096	-	-	-	-	-	-	-	47,338	-	-	35,480,669
Oklahoma	975,571,994	524,776,441	244,546,156	-	-	-	-	-	-	-	-	-	1,744,894,591
Pennsylvania	-	4,551,759	-	125,525	14,733	-	-	-	-	34,970,964	4,935,594	25,446,886	70,045,460
South Dakota	6,340,452	1,636,555	-	-	-	-	-	-	-	-	-	-	7,977,007
Tennessee	138,675	5,092	-	-	-	-	-	-	-	-	-	-	143,767
Texas	2,605,715,654	3,541,581,140	1,960,348,756	unknown	unknown	unknown	unknown	unknown	unknown	unknown	unknown	unknown	8,107,645,550
Utah	67,626,647	77,421,870	-	-	-	-	-	-	-	-	-	-	145,048,517
Virginia	-	1,572,794	54,445	-	-	-	-	-	-	-	-	-	1,627,239
West Virginia	3,660,000	5,850,365	1,621,584	-	114,380	-	-	-	-	35,408,655	-	-	46,654,984
Wyoming	1,220,556,814	208,502,298	-	-	-	-	-	-	-	-	-	-	1,429,059,112
<b>State Total</b>	<b>12,038,533,566</b>	<b>9,130,020,810</b>	<b>2,518,524,154</b>	<b>38,809,684</b>	<b>3,937,317</b>	<b>14,833,907</b>	<b>24,702,940</b>	<b>265,760,348</b>	<b>30,745,992</b>	<b>331,267,608</b>	<b>12,821,320</b>	<b>90,219,191</b>	<b>24,500,176,837</b>
<b>Federal Offshore</b>													
Gulf of Mexico		119,224,348		236,599,954									355,824,302
Pacific		35,083,883		11,689,087									46,772,970
<b>Federal Total</b>	<b>-</b>	<b>154,308,231</b>	<b>-</b>	<b>248,289,041</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>402,597,272</b>
<b>U.S. Total (rounded)</b>	<b>12,038,534,000</b>	<b>9,284,329,000</b>	<b>2,518,524,000</b>	<b>287,099,000</b>	<b>3,937,000</b>	<b>14,834,000</b>	<b>24,703,000</b>	<b>265,760,000</b>	<b>30,746,000</b>	<b>331,268,000</b>	<b>12,821,000</b>	<b>90,219,000</b>	<b>24,902,774,000</b>
<b>Percent of Total</b>	<b>48.34%</b>	<b>37.28%</b>	<b>10.11%</b>	<b>1.15%</b>	<b>0.02%</b>	<b>0.06%</b>	<b>0.10%</b>	<b>1.07%</b>	<b>0.12%</b>	<b>1.33%</b>	<b>0.05%</b>	<b>0.36%</b>	<b>100.00%</b>

# STATE SUMMARIES

- State-by-state summary of the data received
- 26 states replied with populated copies of Tables 1 and 2 from the questionnaire
- Data is presented as received with some basic rounding
- Six states (AZ, AR, FL, LA, OK, UT) required additional data be obtained via online sources or from different agencies

2021 Rank	State	Volume (bbl/yr)	Percent of Total	2017 Rank	2012 Rank
1	Texas	1,724,402,106	42.1%	1	1
2	Federal Offshore	627,291,957	15.3%	2	2
3	New Mexico	451,085,590	11.0%	5	7
4	North Dakota	405,127,827	9.9%	3	3
5	Alaska	159,622,902	3.9%	4	5
6	Colorado	153,495,589	3.8%	8	9
7	Oklahoma	148,337,394	3.6%	7	6
8	California	137,117,236	3.4%	6	4
9	Wyoming	85,290,133	2.1%	9	10
10	Utah	35,513,708	0.9%	12	12

2021 Rank	State	Volume (Mmcf/yr)	Percent of Total	2017 Rank	2012 Rank
1	Texas	10,741,016	26.2%	1	1
2	Pennsylvania	7,656,814	18.7%	2	4
3	Alaska	3,505,248	8.5%	4	6
4	Louisiana	3,379,390	8.2%	3	3
5	West Virginia	2,675,208	6.5%	9	11
6	Oklahoma	2,544,913	6.2%	5	7
7	New Mexico	2,421,424	5.9%	10	9
8	Ohio	2,256,484	5.5%	8	21
9	Colorado	1,956,843	4.8%	6	2
10	Wyoming	1,081,393	2.6%	7	5

# Questions

## U.S. Produced Water Volumes & Management Practices in 2021

*Jon W. Seekins / ALL Consulting*

For Full Report - [www.GWPC.org](http://www.GWPC.org) SPECIAL THANKS TO:

*ALL 36 State Oil & Gas / Environmental Agencies  
Groundwater Protection Council (GWPC)  
Jon Veil, Veil Environmental, LLC*