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Drilling California Dry:
An Analysis of Oil and Gas Water Usage Since 2018

As California suffers from a major drought and enters a climate change fueled wildfire season, oil and gas operators continue to use hundreds of millions of gallons of freshwater for drilling operations annually.[1] It's a vicious symbiotic cycle: fracking and drilling contribute to climate change and suck up finite water resources, then drought and wildfires worsen from climate change.

Food & Water Watch found that from January 2018 to June 2021, the oil and gas industry used over **3 billion gallons** of freshwater for drilling operations that could otherwise have supplied domestic systems (see Appendix below).[2] Although Governor Gavin Newsom pledged on the campaign trail to "oppose fracking and other unsafe oil operations" and to shut down the Aliso Canyon gas storage facility in Los Angeles[3] — he has yet to make his promises a reality. Since January 2019, when Governor Newsom took office, more than **1.4 billion gallons** of freshwater were diverted to oil and gas operations.[4]

For a comparison of what that looks like, the 3 billion gallons of water used to drill oil and gas wells in the state would fill about **4,570 Olympic-sized pools**[5] or supply local California households with **over 120 million showers**.[6] It also exceeds the amount of water that Californians are recommended to use on a daily, per capita basis during drought (55 gallons per day).[7] The freshwater sucked up by the oil and gas industry could have provided everyone in the city of Pasadena with the recommended amount of daily water for an entire year, or everyone in the city of Ventura for 16 months.[8]

At the same time, oil and gas development pollutes and threatens California's finite freshwater resources. making it unusable. When oil and gas corporations want to discard the toxic wastewater produced during drilling, underground injection is their most common disposal method.[9] In California, some corporations have routinely injected oil wastewater directly into aquifers.[10] This toxic wastewater contains fracking fluids, contaminants, brines and radioactive materials. [11] Injecting toxic wastewater into underground wells puts drinking water at risk and is linked to increased earthquake activity.[12]

On top of all of this, the increase in frequency, size and severity of wildfires associated with climate change can have huge impacts on water sources in burned areas. These regions have more soil and stormwater runoff, increasing the amounts of sediment, nitrogen, phosphorus and trace metals present in the water, as well as causing higher turbidity and more organic material to enter the water.[13]

With the oil and gas industry fueling more climate change, more drought and increased and worsening wildfires, we must eliminate all drilling in California right now: 20 years is too long to wait. And Governor Newsom's 2024 fracking ban endangers too many frontline communities. We need action now.

Conclusion

Governor Newsom committed to providing the people of California with clean air and water in order to protect vulnerable communities and stave off the impacts of climate change. He campaigned on a pledge to "a long-term transition away from fossil fuels" and to oppose fracking and other dangerous well stimulation operations.[14] He recognized that decisions must be made to protect the environment, address the rising sea level and safeguard drinking water resources that are affected by climate change.[15] Now is the time to deliver on those commitments.

***Note**: Earlier versions of this research attributed industry water use in 2018 as during Governor Newsom's administration. Governor Newsom took office in 2019. This version is updated to reflect these changes.*

Appendix

Table 1. Total Water Used for Oil and Gas Drilling in California (January 2018 to June 2021)[16]

Year	Well Type*	**Gallons of Freshwater** (water that would otherwise be used by domestic systems but was diverted for use by the oil and gas industry)[17]	**Total Gallons** (all water used)
2018	OG (Oil and Gas)	n/a	32,619,888
	SC (Cyclic Steam)	414,248,814	3,121,222,944
	SF (Steam Flood)	773,429,706	15,895,680,234
	WF (Water Flood)	5,407,710	23,926,655,424
	Other (AI, GD, GS, INJ, PM, WD)	382,976,118	22,304,966,460
	2018 TOTAL	**1,576,062,348**	**65,281,144,950**
2019	OG (Oil and Gas)	n/a	n/a
	SC (Cyclic Steam)	333,716,208	4,164,072,066
	SF (Steam Flood)	161,711,634	13,647,577,146
	WF (Water Flood)	765,240	30,689,678,166
	Other (AI, GD, GS, INJ, Multi, PM, WD)	198,224,880	25,251,028,740
	2019 TOTAL	**694,417,962**	**73,752,356,118**
2020	OG (Oil and Gas)	n/a	331,968
	SC (Cyclic Steam)	218,554,896	4,656,189,468
	SF (Steam Flood)	159,797,526	12,859,177,338
	WF (Water Flood)	n/a	24,441,440,142
	Other (AI, GD, GS, INJ, Multi, PM, WD)	268,329,768	19,607,170,212
	2020 TOTAL	**646,682,190**	**61,564,309,128**
2021 (First and Second Quarters Only)	OG (Oil and Gas)	n/a	n/a
	SC (Cyclic Steam)	21,218,778	215,044,494
	SF (Steam Flood)	28,226,772	1,660,187,256
	WF (Water Flood)	n/a	3,400,530,882
	Other (INJ, Multi, WD)	51,248,106	3,046,806,924
	2021 TOTAL	**100,693,656**	**8,322,569,556**
GRAND TOTALS		**3,017,856,156**	**208,920,379,752**

*Air Injector (AI), Core Hole (CH), Dry Gas (DG), Dry Hole (DH), Gas (GAS), Gas Disposal (GD), Gas Storage (GS), Injector (INJ), Liquid Petroleum Gas (LG), Multi-Purpose (Multi), Observation Well (OB), Oil and Gas (OG), Pressure Maintenance (PM), Cyclic Steam (SC), Steam Flood (SF), Unknown well type (UNK), Water Disposal (WD), Water Flood (WF), Water Source (WS).[18]

Endnotes

[1] Arora, Priya. "Where's the water? Drought threatens California's lifeline." *New York Time*s. May 20, 2021; Food & Water Watch (FWW) analysis of WellSTAR, Well Injection Data (BQ), 2018 - June 2021. DOC. CalGEM. Available at https://wellstarpublic.conservation.ca.gov/General/PublicDownloads/Index. Accessed July 2021. FWW calculated water injected into California wells from 2018 through June 2021 using any water source and domestic water systems (source code 03). Water volume converted from barrels to gallons.
[2] FWW analysis of WellSTAR.
[3] Bacher, Dan. "Governor Newsom recommits to closing Aliso Canyon gas facility, but doesn't commit to timeline." *Daily Kos.* June 1, 2019; Newsom, Gavin. Governor. California Budget 2019-20: May Revision 2019-20. May 9, 2019 at 73; Newsom, Gavin, "A sustainable world can start in California." *Medium*. December 5, 2017.
[4] FWW analysis of WellSTAR.
[5] FWW analysis of WellSTAR; Fédération Internationale de Natation (FINA). "Part X: FINA Facilities Rules 2017 – 2021." September 22, 2017 at 7 to 8. Calculation: 3,017,856,156 gallons of freshwater injected by oil and gas operations (2018 – June 2021) / 660,430 gallons of water per Olympic pool = 4,569.5 Olympic pools. (2,500 m^3 = 660,430 gallons).
[6] FWW analysis of WellSTAR; U.S. Environmental Protection Agency. "Showerheads." September 25, 2020. Available at https://www.epa.gov/watersense/showerheads. Calculation: 3,017,856,156 gallons of freshwater injected by oil and gas operations (2018 – June 2021) / 25 gallons per 10 minute shower = 120,714,246 ten minute showers.
[7] Department of Water Resources (DWR). State of California. "Fast Facts on the Water Conservation Legislation." 2019 at 1.
[8] FWW analysis of WellSTAR; U.S. Census Bureau. Population Division. "Annual Estimates of the Resident Population for Incorporated Places in California: April 1, 2010 to July 1, 2019." April 20, 2021. Available at https://www.census.gov/data/tables/time-series/demo/popest/2010s-total-cities-and-towns.html. Accessed May 28, 2021. Calculation example: 3,017,856,156 gallons of freshwater injected by oil and gas operations (2018 – June 2021) / water recommendation (55 gallons/day/person) / 141,029 Population of Pasadena = 389 days.
[9] U.S. EPA. "Hydraulic Fracturing for Oil and Gas: Impacts From Hydraulic Fracturing Water Cycle on Drinking Water Resources in the United States." EPA-600-R-16-236Fa. December 2016 at 3-23 and 8-1.
[10] Sommer, Lauren. "How much drinking water has California lost to oil industry waste? No one knows." *KQED Science.* August 3, 2017.
[11] Adgate, John L. et al. "Potential public health hazards, exposures and health effects from unconventional natural gas development." *Environmental Science & Technology*. Vol. 48, Iss. 15. 2014 at 8313.
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[13] Emelko, Monica B. et al. "Implications of land disturbance on drinking water treatability in a changing climate: Demonstrating the need for 'source water supply and protection' strategies." Water Research. Vol. 45, Iss. 2. January 2011 at 463 to 467.
[14] Newsom, Gavin. Governor. California Budget 2019-20: May Revision 2019-20. May 9, 2019 at 73; Newsom, Gavin, "A sustainable world can start in California." *Medium*. December 5, 2017
[15] Office of Governor Gavin Newsom. "Governor Newsom delivers state of the state address." February 12, 2019.
[16] FWW analysis of WellSTAR.
[17] DOC. "Data Dictionary for Water Resources: Water Produced from, or used in, oil and gas fields." Public Resources Code. December 2018 at 18.
[18] DOC. Geologic Energy Management. "WellSTAR Data Dashboard Glossary: Frequently Used Terms." Accessed May 2021 at PDF 4.