

Content Analysis of News Coverage about Produced Water: A Pilot Study

Ashley Gunning
Texas Tech University
asgunnin@ttu.edu

Dr. Courtney Meyers
Texas Tech University
Courtney.Meyers@ttu.edu

Dr. Laura Fischer
Texas Tech University
Laura.Fischer@ttu.edu

Jessica Dammers-Hemphill
Texas Tech University
jdammers@ttu.edu

Presley Ramey
Texas Tech University
pramey@ttu.edu

Riley Lopez
Texas Tech University
rillopez@ttu.edu

Introduction/Need for Research

Each day, the Permian Basin area of New Mexico and Texas pumps around 6 million barrels of crude oil (EIA, 2026). For every barrel of crude, about three or four barrels of water are also pumped from the ground (Texas Produced Water Consortium, 2022), which results in an estimated 22 million barrels of water each day. The water recovered during the oil and gas extraction process has been called “produced water,” and in a region suffering from water shortages and drought, experts are weighing in on the possibility of treating this wastewater to remove harmful constituents then reusing it in beneficial ways (Masum, 2026). Several of these application suggestions have direct connection to agriculture and natural resources: rangeland restoration, agricultural irrigation, and stream/river discharge (Texas Produced Water Consortium, 2022). The topic of produced water reuse involves legislative, economic, scientific, and environmental implications. While reusing this water presents several opportunities, there are challenges and perceived risks associated with this approach (Hardberger, 2023). How the media presents information can influence public perceptions of risk (Otieno et al., 2013); therefore, the purpose of this pilot study was to explore how the media are covering the topic of oil and gas wastewater for beneficial reuse.

Theoretical Framework

Framing involves the selection of certain aspects of a topic and making them more relevant in a message (Entman, 1993). Framing theory is commonly used to study how news media present information to their audience members. Within environmental topics, framing theory has been used to study media content about climate solutions (Their & Wu, 2024), nuclear energy (Vossen, 2020), wind energy (Diamond et al., 2025), and fracking (Olive & Deshad, 2017). Other researchers have explored how water reuse was framed in the media (Fu et al., 2025; Goodwin et al., 2018), but additional research is needed to explore how the media presents the topic of oil and gas wastewater treatment and reuse.

Methodology

This pilot study used a quantitative content analysis to examine newspaper coverage of produced water management. News articles were sourced from Nexis Uni using the search: “Produced water OR Fracking Water OR Oil and gas wastewater AND Reuse OR recycling OR desalination OR management OR treatment OR discharge”. The search extended across a five-year timeframe (January 2020 - December 2025). The initial search resulted in 350 news articles. Each article was reviewed for relevancy, resulting in 139 relevant articles. The sample was randomized and 14 articles were randomly selected for this pilot study. A codebook was created to categorize the topic, overall tone, sources of quotes, risk perceptions, benefit perceptions, and word choice used for produced water in each article. Coders selected one overarching topic per article from the following categories: *market/industry update*, *policy/regulatory*, *research and technology development*, *infrastructure*, *environmental impacts*, or *other*. Multiple risk and benefit perception topics could be selected. Risk perception options were *environmental*, *human health*, *regulatory and compliance*, *public perception*, *financial/economic*, *technological*, *lithium extraction*, and *other*. Benefit perception options included the same options, with *social benefits* replacing *human health*. Coders could select multiple sources for quotes attributions, with options being *agricultural water users*, *community members*, *environmentalists*, *filtration*

industry, regulatory groups, policy/lawmakers, industrial water users, researchers, and other. Three coders participated in a training session to review the codebook and relevant definitions. Following the training, revisions were made to improve the clarity of coding instructions. Using ReCal 3.0 we obtained a Krippendorff's alpha of .88, which is considered acceptable reliability (Wimmer & Dominick, 2014). For the purpose of this pilot study, we proceeded with the lead researcher's coded data for the results section. Frequencies were calculated using SPSS.

Results

The content analysis identified policy and regulation ($n = 6$, 42.9%), and research and technology ($n = 5$, 35.7%) as dominant topics. The least common topics were market and industry updates ($n = 1$, 7.1%) and environmental impacts ($n = 2$, 14.3%). In terms of tone, articles were equally divided between negative ($n = 5$, 35.7%) and positive ($n = 5$, 35.7%), with four articles (28.6%) remaining neutral. For sources of quotations, coders could indicate multiple sources. The most prevalent sources were oil and gas industry members ($n = 4$, 28.6%), environmental groups ($n = 3$, 21.4%), water filtration industry members ($n = 3$, 21.4%), and regulatory groups ($n = 3$, 21.4%). The least commonly used sources were politicians and lawmakers ($n = 2$, 14.3%) and researchers ($n = 2$, 14.3%). No articles in the sample had quotes from agricultural water users, community members, or industrial water users. For risk perceptions, the most frequently mentioned category was environmental risk ($n = 7$, 50%), followed by human health ($n = 5$, 35.7%), and regulatory and compliance ($n = 4$, 28.6%). For benefit perceptions, the leading topics were technological innovations ($n = 7$, 50%), financial or economic ($n = 5$, 35.7%), environmental ($n = 3$, 21.4%), and lithium extraction (3, 21.4%).

Conclusions/Discussion/Recommendations

In this study, news coverage primarily portrayed produced water as a policy and regulatory risk and implied existing regulatory frameworks were insufficient to permit the beneficial reuse of treated desalinated polished produced water. News media coverage can be a tool to disseminate information and shape an audience's perception of a topic (Otieno et al., 2013), meaning the emphasis on regulatory risks may impact public perceptions of safety of treatment and beneficial reuse applications. The second most dominant theme was research and technology, which was framed as a benefit. This suggests the news coverage portrays produced water treatment technology as a viable solution to address water scarcity with reservations about regulation and emphasizes the need for transparent communication about the regulatory framework and permitting process required to allow beneficial reuse. Despite policy and regulation being the dominant theme, policy makers were the least cited sources of information, while oil and gas industry members were the most common quoted sources. Future news coverage could use policymakers and independent researchers as sources to provide more transparency about the permitting process, government oversight, and the safeguards in place to protect public and environmental health. In the future, this study will be expanded to analyze the remaining news articles identified with the search parameters. We recommend conducting additional crosstabulations to look for patterns in the larger data set. Content analysis can be a valuable tool to identify how the media presents key themes, benefits, and risks regarding variety of agriculture or related topics.

References

- Diamond, E., Damato, N., Bidwell, D., & Smythe, T. (2025). Framing the wind: Media coverage of offshore wind in the Northeastern United States. *Environmental Communication*, 19(2). <https://doi.org/10.1080/17524032.2024.2374927>
- EIA (2026). EIA refines estimates for Permian tight oil and shale gas production. <https://www.eia.gov/todayinenergy/detail.php?id=67364>
- Entman, R. M. (1993). Framing: Toward clarification of a fractured paradigm. *Journal of Communication*, 43, 51-58. <https://doi.org/10.1111/j.1460-2466.1993.tb01304.x>
- Fu, S., Moanga, D., Hacker, M. E., Scruggs, C., & Osman, K. K. (2025). Exploring state-level messaging toward US water reuse: a media analysis across time and space. *Environmental Research: Infrastructure and Sustainability*, 5, 035012. <https://doi.org/10.1088/2634-4505/adf664>
- Goodwin, D., Raffin, M., Jeffrey, P., & Smith, H. M. (2018). Evaluating media framing and public reactions in the context of a water reuse proposal. *International Journal of Water Resources Development*, 34(6), 848-868. <https://doi.org/10.1080/07900627.2017.1347085>
- Hardberger, A. (2023). The challenges and opportunities of beneficially reusing produced water. *Duke Environmental Law & Policy Forum*, 34. <http://dx.doi.org/10.2139/ssrn.4942131>
- Masum, M. (2026, June 23). Texas has a water shortage and a water glut. They're the same problem. *Texas Observer*. <https://www.texasobserver.org/permian-basin-oil-wastewater-glut/>
- Olive, A., & Delshad, A. B. (2017). Fracking and framing: A comparative analysis of media coverage of hydraulic fracturing in Canadian and US newspapers. *Environmental Communication*, 11(6), 784-799. <https://doi.org/10.1080/17524032.2016.1275734>
- Otieno, C., Spada, H., & Renkl, A. (2013). Effects of news frames on perceived risk, emotions, and learning. *PLoS ONE*, 8(11), e79696. <https://doi.org/10.1371/journal.pone.0079696>
- Texas Produced Water Consortium. (2022). *Beneficial use of produced water in Texas: Challenges, opportunities and the path forward*. <https://www.depts.ttu.edu/research/tx-water-consortium/downloads/22-TXPWC-Report-Texas-Legislature.pdf>
- Their, K., & Wu, X. (2025) Framing climate solutions: An exploratory quantitative content analysis. *Environmental Communication*, 19(3), 359-375. <https://doi.org/10.1080/17524032.2024.2396978>
- Vossen, M. (2020). Nuclear energy in the context of climate change: A frame analysis of the Dutch print media. *Journalism Studies*, 21(10), 1439-1458. <https://doi.org/10.1080/1461670X.2020.1760730>
- Wimmer, R. D., Dominick, J. R. (2014). Mass media research an introduction (10th ed.). Wadsworth.