Water Futures Contracts and Water Scarcity (early stage work)

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April 30, 2026

Abstract

In December 2020, CME Group launched the world's first water futures market amid growing water scarcity in California, sparking a heated debate about whether the financialization of water helps or harms sustainable water management. Yet trading volume has remained persistently low, raising the question of whether the market has any real-world effect at all. This paper provides the first empirical examination of whether the futures market introduction affected water use and water rights transaction dynamics in California, contributing to both the literature on market environmentalism and the finance literature on the real effects of commodity derivatives markets. Using water price index data, futures contract data, drought records, and water rights petition data, I test two null hypotheses: that the introduction had no significant effect on aggregate water use, and no significant effect on the volume, frequency, or composition of water rights transactions.

NOTE FROM AUTHOR:
This paper is a work in progress at an early stage of development. The analyses presented are exploratory and descriptive; formal econometric identification of causal effects is ongoing. The data descriptions, figures, and preliminary observations should be read as groundwork rather than conclusive findings, and the framing, hypotheses, and empirical strategy remain subject to revision. This draft is shared to invite feedback and to update the reader on work in progress. It is not intended to represent a complete or polished paper.
I expect this paper to be a public working paper in September 2026, and presenting at the NBER Climate Finance PhD Workshop would be a valuable opportunity both for receiving feedback at a critical stage of the research and in the context of going on the job market.
Thank you!

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1 Introduction

Water scarcity is one of the most pressing issues in the US, especially in Western States, where water is limited and the region is dry, and characterized by significant population growth (Schwabe, Nemati, Landry, & Zimmerman, 2020). First, water demand in California is high due to agricultural activities: California produces nearly half of all vegetables and over three-quarters of fruits and nuts grown in the US California Department of Food and Agriculture (2024). The biggest share of agricultural revenue is earned with irrigated crops, which causes excessive water use (Schwabe et al., 2020). Indeed, California uses the most water (in total and per capita) of all the states in the US (Orobello & Cirella, 2021). Next, water supply in California is naturally scarce and volatile, and this will only worsen due to climate change (Mount, Hanak, Escriva-Bou, & Gray, 2023). California is actively overhauling its water governance in response to scarcity pressures (Casper, 2026), but in practice, there are still many high value nut trees irrigated that need a lot of water and deplete water groundwater resources (Fulton, Norton, & Shilling, 2019). The result is a state facing a structural imbalance between water supply and demand that shows no sign of resolving on its own, making the search for effective management tools both urgent and consequential.

Because of the water scarcity, there is a substantial water price risk for parties that need to buy water rights on the water rights market. At the end of 2020, the world's first water futures market was initiated in California: the Nasdaq Veles California Water Index Futures, based on the NQH2O index (CME Group, 2021), a volume-weighted average of water prices from the five largest water rights (spot) markets in California, covering both groundwater basins and surface water. The index sets a weekly benchmark price for water rights based on California's underlying water trading markets. The NQH2O index is used as the settlement price of the cash-settled water futures contract (listing multiple expiration dates). The stated objective of this futures market is to manage water price risk and water scarcity, provide greater price transparency, and improve competition (Moore, 2024). Moreover, farmers and municipalities could use the water futures to manage water price risks arising during water supply shortages from droughts and climate change (Hanak, 2021). For example, the water futures could function as insurance (for example, agricultural, commercial, and municipal water users can insure a specific effective water price by purchasing a futures contract).

The introduction of this water futures market has caused a heated debate around the water futures contracts market. Both proponents and opponents of water futures trading emphasize the vitalness and scarcity of water, yet, then parties head into different directions in terms of proposed solutions, with one side declaring market approaches a necessity, while the other views them as a threat to accessibility for all (Christen, Böcher, & Schneider, 2025). The proponents of water futures markets pose that water futures markets improve the water market through information discovery and risk-sharing. On the other hand, opponents state that proposed speculation pushes prices up and make the prices more volatile, which is disadvantageous to end users. Policy makers have also largely stayed out of the introduction of the market (Christen et al., 2025). At the state level, no political statement has ever been issued about the markets (Christen et al., 2025), but at the federal level there has been: Senator Elizabeth Warren and Californian representative Ro Khanna introduced an (unsuccessful) bill to ban the trading of water and water rights in the form of futures (*Future of Water Act, H.R. 7182*, 2022), and the bill was recently reintroduced in the 118th Congress

(Singh, 2024). Either way, it is clearly a hot-topic, but maybe not so much in the state itself.

At the same time, there appears to be a very low trading volume on the futures market, supposedly due to a lack of effective hedging demand for water price risk due to heterogeneity and limited size of the spot water markets (Wang & Wang, 2023). This raises questions about its use in the first place: is the futures market even being used at all? And if it is being used, by whom? If the market is not being used all that much, it may not matter at all. It seems like the heated discussion around the desirability of the water futures market is fed by the fact there are almost no empirical nor theoretical proves for the statements made by both parties on either side. Both opponents and proponents make statements without proof, and thus both parties will never converge to one another. I see this is a chance to make impact: by doing analyses about the water futures market and the impact of its introduction, I can provide useful information to inform the discussion.

This paper will empirically examine whether the introduction of the world's first water futures market has had any measurable effect on water use and water rights transaction dynamics in California. Despite the heated debate surrounding the market, the combination of low trading volume and a lack of empirical evidence means that neither proponents nor opponents have grounded their claims in data, and this empirical gap is what this paper aims to address. Specifically, I test two null hypotheses: that the futures market introduction had no significant effect on aggregate water consumption in California, and that it had no significant effect on the volume, frequency, or composition of water rights transactions. Notably, both camps of the debate around water futures share the concern of water scarcity. This places the paper squarely within the literature on market environmentalism, which asks whether market-based instruments can meaningfully address environmental challenges. By empirically examining the impact of the futures market introduction on water use and water rights transactions, this paper provides evidence on whether financialization of a scarce natural resource can serve as a tool for sustainable water management, or whether it is, in practice, inconsequential.

The contribution of this paper is best understood against the backdrop of the emerging literature on water rights and futures markets, primarily in California. Christen et al. (2025) study the emergence of the water futures market through qualitative interviews, investigating why such a market exists and tracing the debate around the privatization of natural resources. They find that California policymakers have been remarkably silent on the matter, while proponents and opponents hold sharply diverging views. This paper complements their work by empirically testing some of the assumptions underlying those opposing views, aiming to bring greater clarity to the debate. Wang and Wang (2023) investigate the low trading volume of water futures and propose measures to stimulate market activity; this paper extends their analysis by incorporating more recent data, as their water rights trade records extend only to 2009 to examine why the futures market could have low trading volume. Moreover, we do not aim to study the trading volume as a goal by itself, but more as an economic mechanism in managing water scarcity. Finally, Schwabe et al. (2020) assess whether water rights markets in the Western United States help address water scarcity. This paper builds on their work by asking whether a futures market specifically has a meaningful role to play in managing that scarcity.

From a finance perspective, the water futures market represents a novel attempt to price and allocate a nature-related risk through a standardized financial instrument. Water

scarcity is increasingly recognized as a material climate risk (Task Force on Climate-related Financial Disclosures, 2017), yet unlike carbon or weather derivatives, water lacks a liquid, well-integrated underlying market, making the design and impact of water-linked financial instruments challenging. A growing body of climate finance research has begun examining how water-related risks are reflected in asset prices: Hong, Li, and Xu (2019) and Kim, Jeon, and Kim (2024) find that drought risk is not fully priced in equity markets, while Fernández, Bosch-Badia, Capellá-Blanch, and Clariana-Rodagut (2024) document a negative relation between firm-level water use and stock returns. More recently, Alves, De Waal, Hagens, ten Bosch, and van Dijk (2025) find evidence of a water use premium in global equity markets, particularly within industries, suggesting that investors are beginning to incorporate water risk into asset prices. Jin, Li, Roca, and Wong (2016) show that asset illiquidity is priced in the stock returns of global water companies, underscoring that water has unique financial characteristics different from other commodities. The introduction of a water futures market sits at the intersection of these concerns: if investors are pricing water risk in equities, a derivatives market could improve the efficiency of that pricing process. Moreover, prior work on commodity derivatives shows that futures market introductions can affect spot price volatility and resource allocation in agricultural and energy markets (Cheng & Xiong, 2014; Gorton & Rouwenhorst, 2006), although the evidence on whether and how speculation drives prices remains inconclusive (Haase, Zimmermann, & Zimmermann, 2016). Water differs fundamentally from agricultural commodities in its limited transportability and fragmented spot market, making it an important and understudied test case for the real effects of financial market introduction.

Taken together, this paper sits at the intersection of these two literatures. It brings empirical evidence to the debate about water futures and their effectiveness and purpose, while offering the finance literature a novel test case for whether the introduction of a derivatives market can improve the allocation of a scarce and locally heterogeneous natural resource.

2 Research Question and Hypotheses

The debate around the water futures market touches on a wide range of potential effects, from speculation-driven price volatility to improved risk-sharing and more efficient water allocation. While the commodity futures literature has not supplied a clear answer on whether speculation reinforces price movements even in traditional commodity markets, this question is particularly difficult to answer in the context of water as a commodity: trading volume is much lower than in traditional commodity markets Wang and Wang (2023), and it is not possible to observe who is a speculator and who is a hedger on the water futures market. Moreover, water does not behave like other commodities: there is no well-connected underlying spot market, as it is not easy to transport water from one region to another.

This paper therefore sets aside the speculation question and focuses on what I think is a much more interesting question: whether this water futures market can help California to sustainably manage water scarcity. Specifically, this paper aims to examine the following (still broadly formulated) questions:

- What is the impact of the introduction of the futures market on (sustainable) water

use? And on water stress? (Controlling for water supply, looking at demand-driven water stress?) So what is the impact on demand for water?

- What is the impact of the introduction of the futures market on water rights transactions? Do certain parties trade more/less? Between what kinds of parties do water rights contracts flow? Could we say something about products and their hedging behavior?

- If drought periods have an impact on these transactions (for example, more trading during periods of higher water prices), is the introduction of the futures market a mediator in this market? Does the futures market provide another tool to manage risk with?

With these questions I contribute to the debate between proponents and opponents of the water futures market. Even though they may disagree right now whether a water futures contract market is the right tool, both proponents and opponents have the same pressing issue top of mind: water scarcity and sustainable water management. Moreover, this falls within the scope of possibilities of what I can measure.

The broader and overarching research question that I touch upon here are about market environmentalism. Namely, the discussion about whether market-based solutions can help address environmental concerns. This water futures market is an example of a market introduced with the aim to help manage scarcity of natural resources; nonetheless, we do not truly now whether the water futures market helps California in its water scarcity problems. Thus, the question I want to answer is whether financialization of a scarce natural resource, such as water, can help in managing its sustainable use? And, importantly, if it does not help in any way in managing water scarcity, for who is this water futures market then actually introduced?

Interesting mechanisms that might be interesting to test: First, the futures price should signal future water scarcity, nudging users to reduce consumption today. But with low trading volume, the signal informativeness may be thin and potentially unrepresentative. Water rights markets in California are also highly fragmented and heterogeneous, so a single index price may not translate into local behavioral change.This motivates the first null hypothesis:

H1: The introduction of the water futures market has no significant effect on aggregate water consumption in California.

Second, the opportunity to hedge risk hedging may change transaction dynamics. If water users can hedge price risk via futures, they may change when and how much they buy on the water right (spot) market, thereby smoothing demand across drought and non-drought periods. At the same time, hedging demand may be too low to show up empirically. This motivates the second null hypothesis:

H2: The introduction of the futures market does not significantly alter the volume, frequency, or counterparty composition of water rights transactions, reflecting the limited hedging uptake among water users.

Together, these hypotheses allow this paper to speak directly to the shared concern underlying both sides of the debate: whether the financialization of a scarce natural resource

can serve as a meaningful tool for sustainable water management, or whether the water futures market is, in practice, inconsequential.

3 Setting the scene: California, Water Scarcity, Regulation and the Water Right and Futures Markets [placeholder]

[placeholder]

4 Methodology

4.1 Current empirical strategy

The empirical strategy will exploit the December 2020 launch of the CME Nasdaq Veles California Water Index Futures as a discrete, externally determined event. The baseline approach is a difference-in-differences design, comparing water use, (type of) water right transactions, and (...) outcomes before and after the launch while controlling for time-varying drought severity or water scarcity data. The key identifying assumption is that, absent the futures market, trends in water use and petition activity would have continued on their pre-2020 trajectory.

There are some threats to identification. First, the confounding role of the Sustainable Groundwater Management Act (SGMA), whose compliance deadlines also fall around 2020; I address this by controlling for SGMA-related institutional changes and by examining heterogeneity across petition types that are and are not plausibly affected by the futures market introduction. Second, and more fundamentally, the futures market was not truly exogenous: it was itself an endogenous response to growing water scarcity, meaning that the same underlying conditions that drove the market's introduction may also affect the outcomes I study. I address this by controlling for drought severity throughout, but acknowledge that this threat cannot be fully resolved without a cleaner instrument.

4.2 Possible extensions

Possible extensions include examining spatial heterogeneity, that are useful in examining hypothesis H2. My current framework treats California as a single unit, but water scarcity is fundamentally a local phenomenon: a drought in the Central Valley hits differently than one in Southern California, and the NQH2O index aggregates across five very different markets. Do the futures market matter more in regions that are more water stressed?

I could split petitions over the five NQH2O markets and test whether transaction dynamics changed differently across regions after the futures launch, interacting the water futures launch (post-Dec 2020) indicator with a local water stress or drought severity measure.

Another possibility is using the GRACE and GRACE-FO satellite data by NASA, that measure terrestrial water storage anomalies Alves et al. (2025). For each water rights petition in eWRIMS, I can match the geographic location of the petitioning party to the nearest

GRACE grid cell, computing a time-varying, location-specific measure of water supply conditions. This allows me to test whether the futures market introduction has a stronger effect on transaction dynamics in locations experiencing more severe local water stress. Due to the coarse spatial resolution (around 300km), this would work only on the basin level.

Finally, another possibility is incorporating USDA crop acreage or CDFA irrigation data at the county level to construct a local water demand measure. This allows me to test whether the futures market introduction has a stronger effect on transaction dynamics in locations where there is a high demand for water.

These possible spatial heterogeneity extensions could be useful for understanding where the futures market affects transaction dynamics rather than aggregate consumption (hypothesis H2).

5 Data exploration

This paper draws on three complementary data sources to examine the impact of the water futures market introduction on water price dynamics, drought conditions, and water rights transaction activity in California. The first is the Nasdaq Veles California Water Index (NQH2O) and its associated CME H2O1 futures contract, which together provide weekly price and volume data on California's water market from 2018 and 2020 onwards respectively. The second is the U.S. Drought Monitor (USDM), which supplies weekly drought severity data for California and serves as the primary control for water supply conditions. The third is the Electronic Water Rights Information Management System (eWRIMS), maintained by the State Water Resources Control Board, which provides records of all formal water rights petitions filed in California from 1914 to the present.

5.1 Water Price Index and Futures Contract Data

The NQH2O index is the Nasdaq Veles California Water Index, which is a price benchmark that tracks spot prices for water rights transactions (leases and permanent sales) across California's five largest trading regions (the surface water market plus four key groundwater basins: Central, Chino, Main San Gabriel, and Mojave Alto). The NQH2O index was launched in 2018, with the aim to reflect water supply-demand dynamics in California. The price index is composed every Wednesday, and feeds the futures contracts' price settlement. The NQH2O price index data was extracted from the FRED St. Louis database on April 16th 2026, and so the dataset starts in 31 October 2018 and ends on 15 April 2026, therefore containing 390 weekly price observations (after filtering for missing values). The observed price range spans from 156.11 to 1,282.07.

CME H2O1 refers to the front-month CME Nasdaq Veles California Water Index Futures contract, the world's first water futures launched by CME Group in December 2020. Financially settled against the NQH2O index, it enables hedging water price risk for farmers, utilities, and investors in California's water market. The CME H2O1 futures contracts data are organized as weekly OHLC records, with 276 observations and standard market variables, including open, high, low, close, and volume. The futures data was extracted from Yahoo Finance on April 29th, 2026. It begins on 7 December 2020 and ends on 27 April

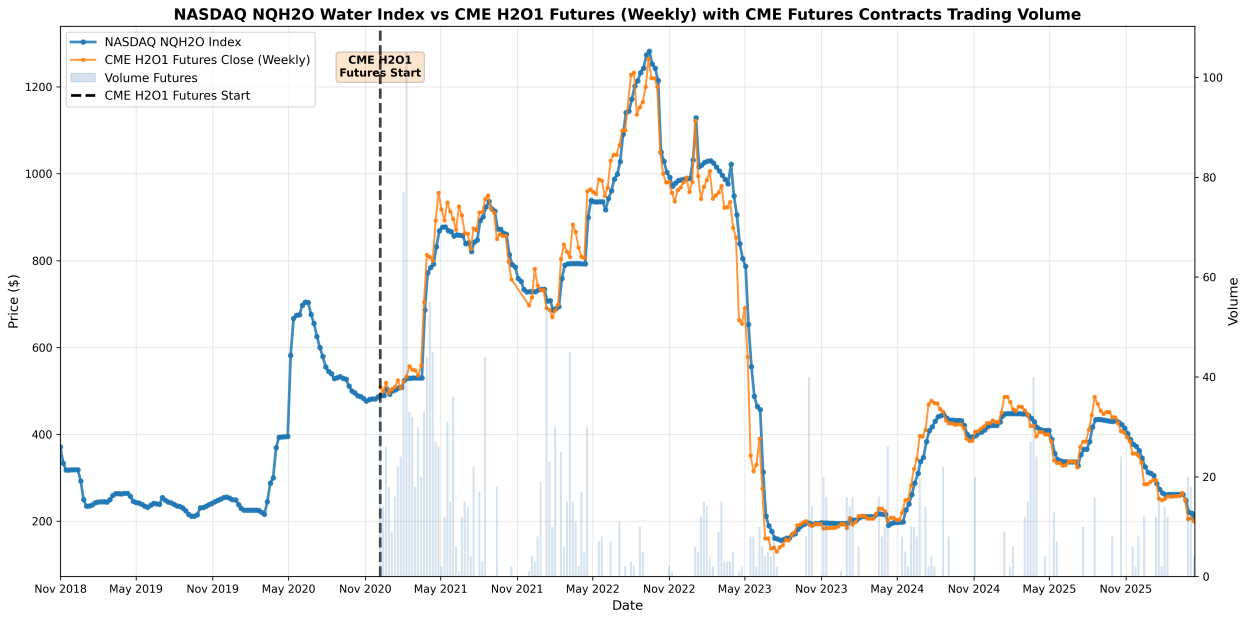


Figure 1: NASDAQ NQH2O Water Index vs CME H2O1 Futures (Weekly) with CME Futures Contracts Trading Volume

2026, with 276 weekly observations. The futures contracts' closing prices range from 130.00 to 1,265.00.

In Figure 1 I plot the price time-series of the water price index (NQH2O) and the related futures contract (CME H2O1), both expressed in US dollars, together with the transaction volume of the futures contracts. From the get-go, the water price has climbed until its peak in September 2022 (see Figure 1), but sharply decreases after 2022. The NQH2O price has not recovered to its high levels since then, and even seems to have declined further in the last months of the dataset. Although the transaction volume of the futures contracts was high shortly after the launch of the water futures market and remained moderately high in 2021 and 2022 (extremely dry years), the volume has since shown a downward trend.

5.2 Drought Conditions: U.S. Drought Monitor

Next, I examine the USDM (U.S. Drought Monitor) data for California. The USDM measures weekly drought conditions across the U.S. via maps updated every Thursday, using a 5-category scale: D0 (abnormally dry) to D4 (exceptional drought). It integrates precipitation, soil moisture, streamflow, and impacts for agricultural/policy use. In Figure 2, I overlay the USDM for California with the NQH2O water price index, to allow visual inspection of their relation. Note that NASDAQ introduced the NQH2O a few years after one of California's worst droughts (the 2012-2016 drought). Moreover, the water price index shows a strong increase in price during the extreme drought in California in 2021.

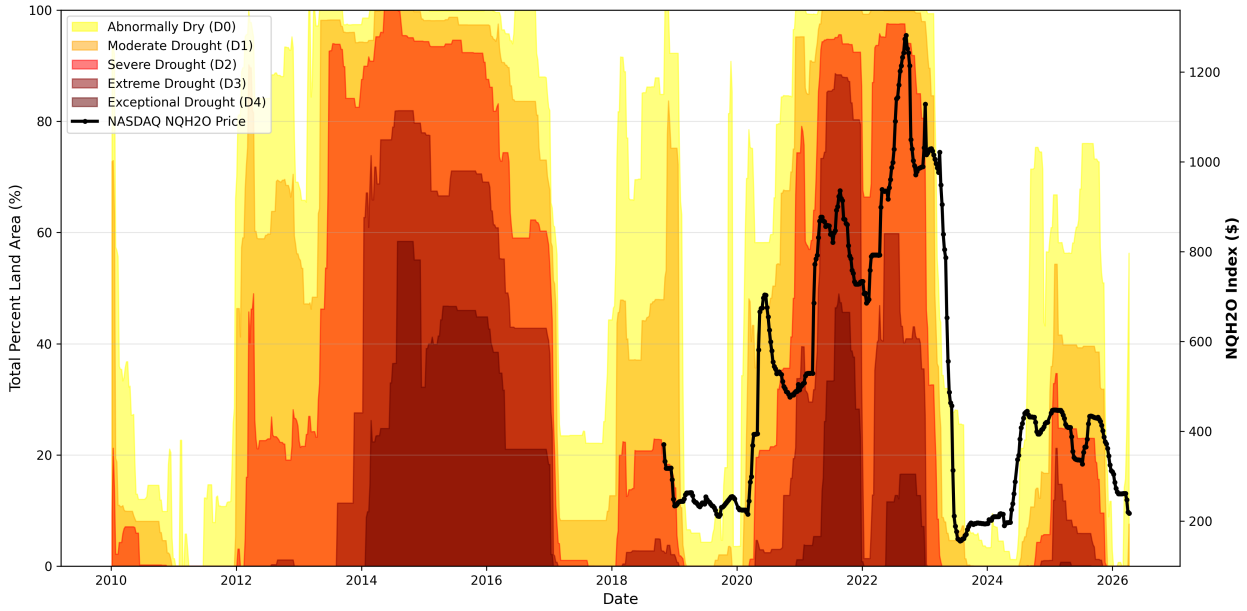


Figure 2: Nasdaq Veles California Water Index (NQH2O) with California US Drought Monitor Background (2017-2026)

5.3 California Water Rights Petitions Database

Water rights petition data for the state of California are drawn from the Electronic Water Rights Information Management System (eWRIMS), maintained by the State Water Resources Control Board's Division of Water Rights and made publicly available through the California Open Data Portal (California State Water Resources Control Board, 2021). The dataset provides one record per unique petition ID and covers all petitions associated with post-1914 water right permits and licenses, including requests to modify existing rights, transfer water to another party, extend permit development periods, dedicate instream flows, and adjust wastewater discharge levels. Each record includes information on petition type and status, the primary water-right holder, geographic identifiers, and the requested and approved transfer volumes and the associated buyer and seller parties (where applicable). The dataset is updated monthly and spans from 1914 to the present, with coverage across the state of California.

To examine trends in petitioning activity (read: changes in water rights activity), Figure 3 plots the annual count of petitions disaggregated by petition type. While the dataset extends back to the early twentieth century, the visualization is truncated to 1990 onward to improve readability and focus the analysis on the contemporary period, during which water markets and transfer activity have become more active. The number of observations from 1920 to 1990 records is sparser, which could reflect both the limited digitization of older filings and the comparatively lower volume of formal petition activity prior to the institutional development of California's water trading framework. Nonetheless, we can still use this data in combination with, e.g., USDM data. The total petitions of the water rights dataset, starting in 1920 and ending in 2025, include 4264 observations, among which there

are 394 *transfer* petitions.

An interesting observation from Figure 3 is that in 2014, during California's worst drought in centuries, the total number of water rights petitions increased substantially compared to the years before. Specifically, the 'temporary urgent change' was the most observed petition in that year. In 2015, the number of petitions is still quite high, but lower than in 2014. This shows that the water rights market transfers water rights from one party to another, especially when their demand changes drastically. Moreover, we also see an increase in petitions in 2021, when another extreme drought (although less extreme than the one in 2014) occurred in California. Interestingly, the distribution of petition type is also different: there seems to be more temporary *transfers* instead of temporary urgent changes. Moreover, in 2020, a relatively bigger part of the distribution is long-term transfers. Could these different dynamics be explained by the introduction of the futures market, controlling for the severity of droughts?

Zooming in into the long term transfer petitions, I observe that the especially in 2020, there are petitions for long term transfers: in May (December) 2020, 14 petitions were received (approved), whereas these long term transfer petitions actually rarely happen: sometimes one or two per year, usually followed by years of inactivity of trading on long term transfer. It is particularly interesting there is a great spike of interest exactly in the year when the water futures contracts were announced. This data anomaly can be explained as follows. These petitions were received four months *before* the public announcement of the futures contracts[1]. This implies that actors filing long-term transfer petitions in May 2020 had *no* public knowledge of the futures contracts. this spike in petitions appears to be driven by compliance pressure of the Sustainable Groundwater Management Act (SGMA)[2] and, possibly, high water prices spiking in 2020 (see Figure 1 and 2). Therefore, I find no evidence of a causal effect of the futures contracts market introduction on the demand for long term transfers of water rights.

Another pattern in the data concerns the composition of short-term water transfer activity over time. Two petition types mark temporary water reallocation in the petition dataset: the Temporary Urgent Change petition, which authorises modifications to an existing water right for up to 180 days on an emergency basis, and the Transfer Temporary petition, which facilitates market-based transfers of water between willing buyers and sellers for periods of up to one year. Both instruments serve short-term supply needs, nonetheless, they differ fundamentally in their legal basis and intent: the former is a regulatory emergency tool invoked when a right holder faces urgent, unforeseen circumstances, whereas the latter is a market transaction between distinct parties.

The temporal distribution of these two petition types reveals distinct institutional re-

[1]The public announcement of the CME/Nasdaq Veles California Water Index futures was September 17, 2020, with trading launching December 7, 2020.

[2]The deadline for California's first round of Groundwater Sustainability Plans (GSPs) was January 31, 2020, for critically overdrafted basins. As SGMA requires groundwater basins to become sustainable, and therefore in 2020 agencies need to plan to increase their use of imported and local surface water for direct use and aquifer recharge, and one way to increase surface water supplies is through market-based long term transfers of water rights. Hence, the SGMA deadline created a structural, legally-mandated need for groundwater sustainability agencies to secure long-term surface water supplies, explaining the May 2020 long term transfer petition spike.

sponses to California's recurring drought episodes. During the 2012–2016 drought, and particularly in 2014 and 2015, Temporary Urgent Change petitions dominated short-term transfer activity overwhelmingly, with 308 and 174 petitions received respectively. These figures dwarf activity in any other year in the dataset. Transfer Temporary petitions, by contrast, remained comparatively modest at 46 and 52 for the same years. This pattern suggests that the 2012–2016 drought response was largely channelled through emergency regulatory mechanisms rather than through market-based transactions, consistent with the institutional immaturity of California's water market at that time. The 2021–2022 drought period exhibits a meaningfully different composition. While Temporary Urgent Change petitions again increased relative to non-drought years, reaching 48 and 40 respectively, the relative share of Transfer Temporary petitions rose substantially, with 83 and 71 petitions recorded in those years.

This shift in the ratio of market-based to regulatory-emergency instruments between the two drought episodes is suggestive of a maturing water market in which participants increasingly turn to bilateral transfers rather than emergency administrative petitions as their first response to scarcity. This is consistent with the implementation of the Sustainable Groundwater Management Act (2014), which created structural long-term demand for surface water supply and arguably deepened market participation among water right holders. At the same time, it could be that improved price discovery (such as the discovery of the NQH2O price index and the water futures contracts) would have impacted the type of demand of transfer. This remains an open empirical question that subsequent analysis in this paper seeks to address.

With the aim to identify temporal leases versus permanent sales, like in the data from WestWater Research used in other papers (Schwabe et al., 2020; Wang & Wang, 2023), I check whether any other types of the petitions could have been characterized as a lease or (permanent) sale by examining the number of sellers and buyers that are reported in the petitions dataset. Even though the 'Change' petitions may contain permanent changes to the water right, I never observe any buyers or sellers associated with that type of petition. Only for the petition types 'Transfer Temporary' and 'Transfer Long term ' do we observe sellers and buyers, for which I compiled summary statistics in Table 1.

Table 1: Summary statistics of number of sellers and buyers for the Water Transfer petition types reported in the California Water Rights Petitions dataset. Count refers to the non-null count within each petition type group, with the percentage relative to the total number of petitions in that group.

	Transfer Temporary		**Transfer Long-term**	
	# Sellers	**# Buyers**	**# Sellers**	**# Buyers**
Count (% of N)	384 (∼58%)	384 (∼58%)	17 (∼59%)	17 (∼59%)
Mean	1.47	3.49	1.88	2.65
Std. Dev.	0.52	3.27	0.33	0.79
Min	1.00	1.00	1.00	1.00
25th Percentile	1.00	1.00	2.00	3.00
75th Percentile	2.00	4.00	2.00	3.00
Max	4.00	15.00	2.00	3.00

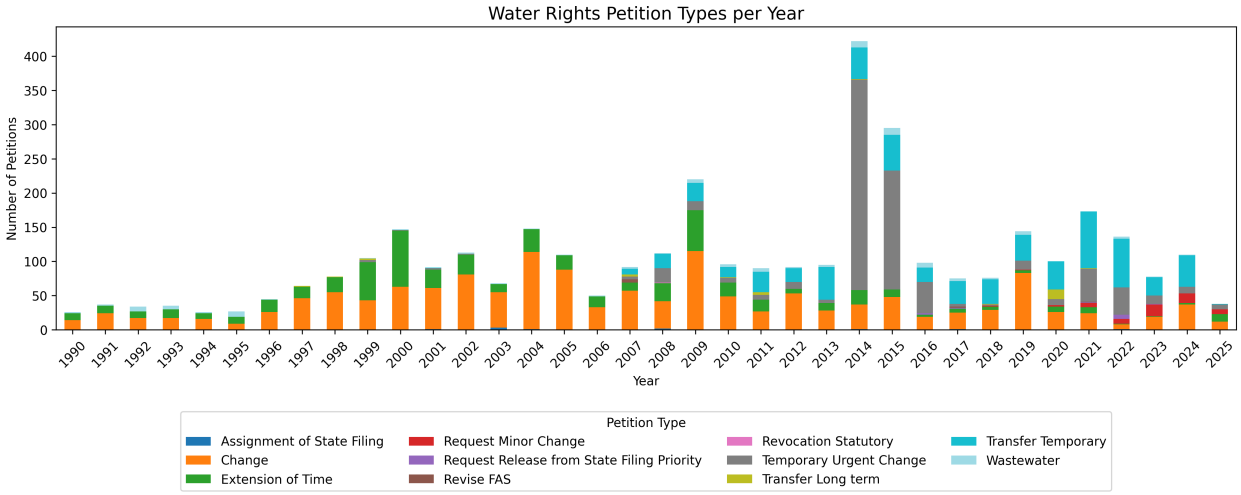


Figure 3: The Number of water rights petitions per year and categorized per petition type, from 1990 onwards.

Table 2: Summary statistics for a selection of numeric variables in the petitions of water rights database

Variable	**N**	**Mean**	**Median**	**Std Dev**	**Min**	**Max**	**% Missing**
Requested Transfer (AF)	394	197,111.1	76,069.0	255,994.9	200.0	3,602,323.0	90.8%
Approved Transfer (AF)	391	188,763.6	56,758.0	190,294.5	1.0	436,720.0	90.8%
Face Value Amount	4,264	808,976.6	4,909.5	1,825,597.2	0.0	11,463,752.5	0.0%
Initial Reported Diversion (AF)	30	2,351.0	126.0	5,545.5	0.0	22,594.0	99.3%
Max Beneficially Used (AF)	3,644	708.0	0.0	12,400.5	0.0	451,794.0	14.5%

6 Results [placeholder]

[placeholder]

7 Discussion and Conclusion [placeholder]

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