

# Memorandum

---

**To:** Roger Tinklenberg, City of Commerce City  
**From:** WestWater Research  
**Date:** June 9, 2017  
**Re:** Analysis of Water Right Appreciation Rates

---

## Background and Purpose

The City of Commerce City (Commerce City) charges land developers a Water Acquisition Fee for each building permit issued. The Water Acquisition Fee is used to purchase water rights for new City facilities such as parks and recreation centers. Commerce City initially set the fee approximately 10 years ago and established a 10% annual increase to reflect anticipated increases in water right acquisition costs. Since that time, the Water Acquisition Fee and appreciation rate have not been adjusted. Commerce City is in the process of updating the Water Acquisition Fee and would like to understand pricing trends for water rights in the Denver area to set an appropriate appreciation rate for the Water Acquisition Fee. To assist with setting the rate, Commerce City has engaged WestWater Research to prepare this analysis of water rights prices.

Water service within Commerce City is provided by South Adams Water and Sanitation District (SACWSD), which requires developers to redeem water tap credits known as Equivalent Residential Units (ERUs) in order to receive water service from the District. As a result, Commerce City must acquire ERUs to receive water service at future City facilities. ERUs are created when water rights are dedicated to SACWSD, and may be transferred within the District's boundaries prior to being redeemed. Commerce City may acquire ERUs by either dedicating raw water rights to SACWSD or purchasing existing ERUs. Pricing for both raw water rights and ERUs are relevant to the Water Acquisition Fee.

This memorandum describes historic pricing and appreciation rates for both raw water rights near Commerce City and ERUs. In addition, an assessment of multiple published price indices and their relevance to the Water Acquisition Fee is provided. The document concludes with recommendations regarding the appreciation rate and future adjustments to the rate. Data presented in the analysis is drawn from *Waterlitix*, WestWater's proprietary database of water rights transactions.

## South Platte River Water Rights

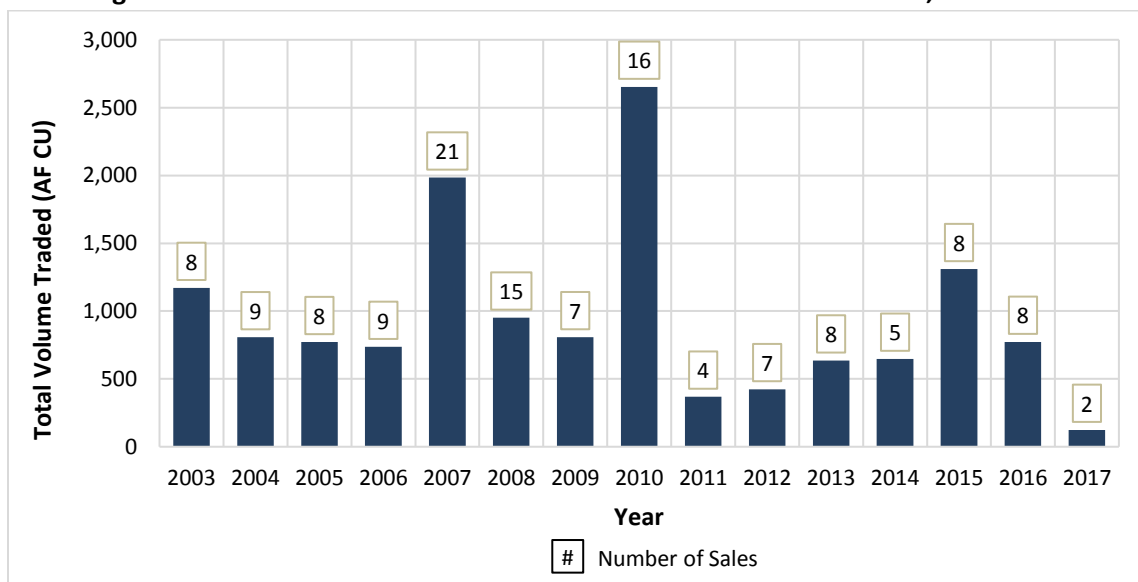
Commerce City is located within the South Platte River Basin in Water District 2. Water delivered to Commerce City by SACWSD is sourced from alluvial wells near the South Platte River. SACWSD owns a portfolio of water rights used to provide augmentation for the well field and is active in acquiring additional water rights through market purchases and dedications from land developers. Within Water District 2, water rights are most commonly represented by shares in mutual ditch companies. There are

many mutual ditch companies within Water District 2 which operate ditch systems to deliver water from the South Platte River to farms within the company's service area. The companies issue shares which represent a pro-rata ownership share of the company's water rights. Some mutual ditch companies allow transfers of shares to water users outside of the ditch company boundaries, and an active market for mutual ditch company shares exists within Water District 2. This analysis focuses on water rights transactions and pricing for mutual ditch company shares within Water District 2 sold separate from land. Appendix A provides a map of Commerce City, South Adams, and the points of diversion for commonly traded mutual ditch company shares within Water District 2.

### ***Market Prices and Trading Activity***

Figure 1 displays the total volume traded annually and number of surface water rights transactions within Water District 2 from 2003 to 2017. An average of 944 acre-feet of transferrable consumptive use (AF CU) has changed hands annually, with between 2 and 21 sales observed annually. Transfers primarily involve agricultural water rights sold to municipal and industrial water users. Cities and metropolitan districts are the most active buyers. In addition, industrial water users such as power plant operators have acquired water rights. Agricultural water users purchase water rights for use in augmentation plans which allow for pumping of tributary groundwater, but are generally less active as buyers in the market.

**Figure 1: Total Volume Traded and Number of Sales- Water District 2, 2003-2017**

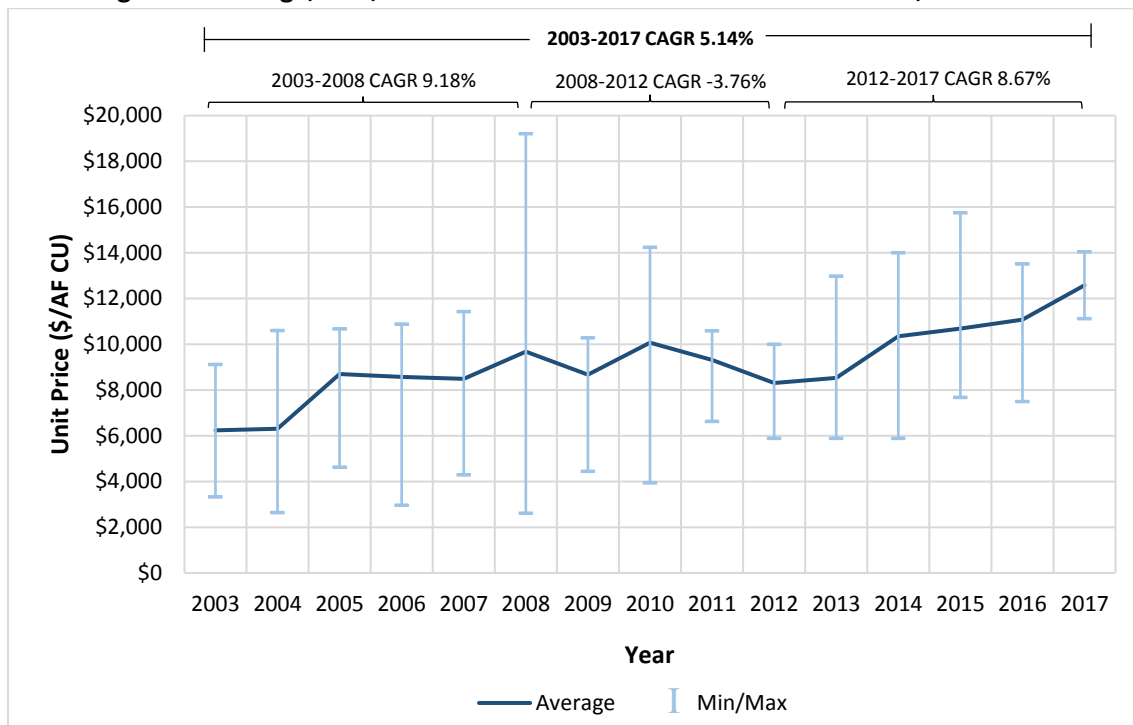


Water rights prices within Water District 2 have shown steady appreciation over the last 15 years. Figure 2 displays the average, minimum, and maximum prices paid for water rights within Water District 2 since 2003. To facilitate comparison, all transactions are reported in terms of the price per AF CU. Since 2003, average prices have risen at a compound annual growth rate (CAGR) of 5.14%. In general, price appreciation within Water District 2 has been driven by urban growth and rising municipal and industrial water demand in the Denver metropolitan area. From 2003 to 2008 during the housing market boom, water right values in Water District 2 appreciated at an average of 9.18% annually. During the housing market downturn from 2009 through 2012, real estate development activity slowed and prices declined at an average rate of 3.76% annually. More recently however real estate values and development activity



have increased, and water right prices have appreciated at a compound annual growth rate of 8.67% since 2012.

**Figure 2: Average, Min, Max Prices for Water District 2 Ditch Shares, 2003-2017**



There is a significant amount of variation in pricing for mutual ditch company shares. For example, in 2016 prices ranged from \$7,500 to \$13,516/AF CU. The variation in pricing is related to the traits of specific water rights. Water rights located upstream closer to Denver have generally sold at a premium to water rights located further downstream on the South Platte River. In addition, mutual ditch companies with storage water rights generally sell at a premium relative to ditch companies owning only direct flow water rights. Storage water rights offer greater reliability and flexibility in timing of deliveries by allowing water to be stored and released as needed. More reliable water rights with senior priority

In the future, water rights prices in Water District 2 are expected to continue to rise. Municipal and industrial water users will continue to compete to purchase water rights to meet rising water demand, driving price appreciation. In the future, water rights prices are projected to continue appreciating at an average rate of 5% to 6% annually over the long-term, which reflects the average appreciation rate observed across multiple real estate cycles since 2003.

## ERUs

In order to receive water service from the District, SACWSD requires land developers to redeem ERUs. One ERU represents approximately enough water rights to supply one single family home. Prior to being redeemed, ERUs may be transferred within the SACWSD service area and a small market exists for buying and selling ERUs. Land developers and homebuilders are the primary participants in the ERU market, and commonly purchase ERUs to provide water for new residential and commercial development projects. Commerce City has also been active in the ERU market as both a buyer and a seller. Commerce City



purchases ERUs to provide water for new city facilities using proceeds from the Water Acquisition Fee, and occasionally sells ERUs to developers to support development of real estate projects within the City.

Trading activity for ERUs is relatively limited, but a number of ERU sales have occurred which provide an indication of price levels and appreciation rates over time. Demand for ERUs is correlated with the housing market and the level of real estate development within SACWSD and Commerce City. Figure 3 displays selected market ERU sales from 2001 to 2017, including all purchases made by Commerce City. As shown, prices for ERUs peaked during the housing market boom from 2006 through 2008, but fell significantly in 2009 following the real estate market collapse.

**Figure 3: Select SACWSD ERU Sales, 2001-2017**



In 2001, multiple land developers acquired ERUs through an agreement with Farmers Reservoir and Irrigation Company (FRICO). Under the agreement, the developers funded a purchase of water rights from FRICO and in exchange received a total of approximately 21,800 ERUs. The ERUs were transferred to the developers over a series of 10 to 15 years in accordance with an annual payment schedule. The cost of the FRICO ERUs in 2001 was \$3,183/ERU. Beginning in 2009, a number of participants in the FRICO ERU agreement defaulted on their payment obligations following the collapse in the real estate market. Following these defaults, the remaining FRICO ERUs were purchased by other entities within SACWSD, including Commerce City, at a relatively low cost, as shown in Figure 3.

Historically, SACWSD has not offered ERUs for sale directly to land developers, but instead has required developers to purchase and dedicate water rights to the District or purchase existing ERUs from other ERU owners. However, in 2016 SACWSD established the Phase 4A program, which made a total of 3,600 ERUs available for purchase directly from the District at a price of \$8,500/ERU. A total of approximately 3,300 Phase 4A ERUs remain available for purchase. Pricing within the Phase 4A program is favorable compared to recent market sales of ERUs, and provides a direct indication of the current value of ERUs.

The 2001 price of \$3,183/ERU observed in the FRICO participation agreement and the current Phase 4A pricing of \$8,500/ERU indicate an average ERU appreciation rate of 6.33% annually since 2001. However,



in addition to the cost of acquiring ERUs, entities seeking to receive water service must pay connection fees to SACWSD when the ERUs are redeemed. The connection fees vary based on the type of ERUs being redeemed, therefore ERUs with lower connection fees are expected to sell at a premium to ERUs with higher fees. The single family home connection fees for FRICO ERUs are currently \$2,826/ERU higher than the connection fees for Phase 4A ERUs.<sup>1</sup> Adjusting for the differences in connection fees, the \$8,500/ERU cost of Phase 4A ERUs indicates a current market value of \$5,674/ERU for FRICO ERUs. At a higher price, developers would be better off financially by purchasing Phase 4A ERUs directly from SACWSD instead of purchasing existing FRICO ERUs. Based on this value, the value of FRICO ERUs has appreciated from \$3,183/ERU in 2001 to \$5,674/ERU in 2017, equivalent to a CAGR of 3.68%. More recently, from 2012 to 2017, prices for FRICO ERUs appreciated from an average of \$4,079/ERU to \$5,674/ERU, equivalent to a CAGR of 6.83%. Pricing for Phase 4A ERUs is attractive relative to ERU market values observed in 2015 and 2016. Prior to the Phase 4A program being introduced, FRICO ERUs sold at prices ranging from \$7,500 to \$8,500/ERU in small volume market sales between developers.

## Standard Price Indices

As an alternative to conducting periodic reviews of water rights values, the Water Acquisition Fee could be indexed to a published price index. If an index is used, it should be correlated with price levels for ERUs and water rights in order to ensure the Water Acquisition Fee accurately reflects Commerce City's cost of acquiring water rights. The following provides a description of multiple published price indices and an assessment of their relevance to water rights prices near Commerce City and the Water Acquisition Fee.

Consumer Price Index- All Urban Consumers (CPI-U): The CPI-U is published monthly by the United States Bureau of Labor Statistics and tracks the price level of all consumer items across the United States. The CPI-U is used as the primary measure of inflation within the economy. Many contracts are indexed to the CPI-U, such that payments increase annually to compensate for inflation. Since 2003, the CPI-U has risen at a compound annual growth rate of 2.09%, compared to an average of 5.14% for water rights in Water District 2. In the future, water rights are expected to continue to appreciate faster than inflation due to water scarcity and rising municipal water demand in the Denver Metropolitan Area. Therefore, it is not recommended that the water acquisition fee be indexed to the CPI-U.

S&P Case-Shiller Denver Home Price Index: The S&P Case-Shiller Denver Home Price Index is a monthly index designed to track changes in price levels for residential real estate in Denver. Water rights in Water District 2 near Commerce City are most frequently purchased by municipal water providers and real estate developers to support land development, and water rights prices are correlated with real estate prices. Water rights prices near Commerce City have historically increased during periods when the housing market is strong and development activity is high. In addition, when real estate prices rise, land developers and municipalities can afford to pay more to acquire water rights contributing to price appreciation. However, real estate prices are significantly more volatile than water rights prices. For example, from 2012 to 2017, the S&P Case-Shiller Denver Home Price Index rose at a CAGR of 24.56%, whereas water rights prices in Water District 2 rose at a CAGR of 8.67% over the same time period. As a result, the Denver Home Price Index is not likely to accurately reflect changes in water rights price levels.

---

<sup>1</sup> South Adams County Water and Sanitation District 2017 Connection Fees. Effective January 1, 2017.



Water Rights Price Index (WRPIx): The WRPIx was developed by WestWater to provide a statistical benchmark to track price levels for water rights across the Western United States. WRPIx is published annually by WestWater based on water rights transactions data from *Waterlitix* for 12 actively traded water markets in 8 western states, including the South Platte River Basin. The index provides a good reference for changes in water rights price levels across the Western United States. However, water rights market are highly localized and the WRPIx incorporates many different water markets. As a result, the index may not provide an accurate reflection of water rights prices near Commerce City. From 2003 to 2015, the WRPIx rose at a compound annual growth rate of 9.17%.

## Summary and Recommendations

Commerce City is in the process of updating the appreciation rate for the Water Acquisition Fee charged to land developers. Proceeds from the Water Acquisition Fee are used to purchase water rights and/or ERUs in order to provide water service at new City owned facilities. Therefore, the appreciation rate applied to the Water Acquisition Fee should reflect appreciation rates for water rights and ERUs.

Prices for water rights within Water District 2 of the South Platte Basin have appreciated at an average rate of 5.14% annually since 2003, but have appreciated more rapidly at a rate of 8.67% since 2012. Similarly, prices for ERUs have appreciated at a rate of 3.68% annually since 2001, but have appreciated more rapidly at a rate of 6.83% since 2012. Prices for both assets are correlated with the real estate market. Prices softened following the housing market downturn in 2009 but have since recovered in correlation with rising real estate values and increased development activity. In the future, prices are expected to continue to rise with price appreciation driven by water scarcity and urban growth in the Denver metropolitan area.

No published price indices were identified that directly track price levels for water rights near Commerce City. As a result, it is not recommended that the Water Acquisition Fee be adjusted based upon a published price index. Instead, Commerce City should set an appreciation rate and periodically revisit and adjust the rate based on an analysis of market data and trends. WestWater recommends that Commerce City reassess the Water Acquisition Fee appreciation rate every 3 years. In addition, WestWater recommends that the current appreciation rate be set at **7.75%** based on average appreciation rates for water rights and ERUs observed in recent years. This recommended appreciation rate is based on water rights pricing during both the economic downturn and recovery. When reassessing the Water Acquisition Fee in future years, Commerce City should review the cost of water rights and ERUs purchased by the City relative to historic acquisition costs. In addition, it is recommended that Commerce City conduct a market analysis of prices for water rights in Water District 2 to identify current price levels, appreciation rates, and market trends.



## Appendix A: Map





