COLORADO
Colorado Water Conservation Board
Department of Natural Resources
1313 Sherman Street, Room 718
Denver, CO 80203

# Memorandum

To: Members of the Senate Agriculture and Natural Resources Committee and House of Representatives Rural Affairs and Agriculture Committee
From: Colorado Water Conservation Board
Date: 2/1/19
Subject: C.R.S. 37-60-126 (4.5) Report

Through House Bill 2010-1051, the Colorado General Assembly passed C.R.S. 37-60-126 (4.5) requiring covered entities[1] to report annually, water use and conservation data to the Colorado Water Conservation Board (CWCB) for statewide water supply planning. The CWCB adopted the "Guidelines Regarding the Reporting of Water Use and Conservation Data by Covered Entities" in November 2011 and developed the "CWCB Water Efficiency Data Portal" to facilitate the reporting process. Reporting through the data portal has been required for all covered entities since 2013.

CWCB has used the reported data ( 1051 data) to support several efforts, including the latest Statewide Water Supply Initiative (SWSI) Update which provides a new statewide municipal demand[2] baseline dataset. The SWSI Update baseline data were calculated from the collective dataset reported between 2013 and 2016 and is being used to represent the baseline year of 2015. The 1051 data have been invaluable for this purpose and the value of the reporting will continue to grow as the available dataset expands with each reporting year.

Per C.R.S. 37-60-126 (4.5), the CWCB submits this report in fulfillment of paragraph (C) (I), "No later than February 1, 2019, the board shall report to the senate agriculture and natural resources committee and the house of representatives agriculture, livestock, and natural resources committee, or their successor committees, on the guidelines and data collected by the board under the guidelines."

The purpose of this report is to give a summary and overview of water data collected since 2013 as well as recommendations for ensuring improvement and usefulness of this data for future statewide water supply planning efforts such as SWSI, Basin Implementation Plans and Colorado's Water Plan.

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[1] [1] A "covered entity" is defined as each municipality, agency, utility, including any privately owned utility, or other publicly owned entity with a legal obligation to supply, distribute, or otherwise provide water at retail to domestic, commercial, industrial, or public facility customers, and that has a total demand for such customers of two thousand acre-feet or more, per Section 37-60-126(1)(b) of the Colorado Revised Statutes (C.R.S.).

[2] The terms water "use" and "demand" are used interchangeably throughout this memorandum.

Element Water Consulting, the consultant working on the demand management aspects of the SWSI Update, worked with CWCB staff to summarize and organize the following information from the 1051 data.

## Data Overview

Between 2013 and 2016, a total of 53 discrete water providers have reported information through the 1051 data portal, with a range of 37 to 50 reporting in any single year. As shown in Table 1 below, the majority of these providers meet the statutory definition of a covered entity, based on the reported average annual billing data equaling at least 2,000 acre-feet per year.

**Table 1. Summary of 1051 Reporting by Year Between 2013 and 2016.**

| Reporting Year: | 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|
| No. of Reporting Providers: | 48 | 50 | 45 | 37 |
| % of Reporting Providers who are Covered Entities: | 79% | 76% | 78% | 86% |

The 1051 data portal is dynamic, allowing water providers to report data under a multitude of categories and timescales, with the intent of providing flexibility to accommodate unique datasets. The following abbreviated list describes the broad categories of data that were utilized for the SWSI Update:

- **Water Use Data**
  - Volume of water produced and exported outside of the service area, reported under the categories of potable, non-potable raw, and non-potable reuse water supply.
  - Volume of water billed to customers, reported by customer category.
- **Service-area population** distributed across counties to synchronize with state demographer-reported numbers. These data are used to normalize the volumetric water use data.

Water conservation program data were not directly used for the SWSI Update but the CWCB has used it for other water efficiency efforts such as evaluating progress of Water Efficiency Plans and aligning grant programs with implementation gaps.

## 1051-Reported Population

According to the state demographer, approximately 5.45 million people lived in Colorado in the year 2015. The water demands associated with approximately 70% of the 2015 population (3.8 million people) were reported through the 1051 reporting process. This is significant, allowing well over half of the statewide SWSI Update demands to be based on current water provider-reported data. Figure 1 below provides a summary of the population located within each basin. For the three most populous basins, which are the Arkansas, Metro Region, and South Platte[3], demands were reported for between about 65% and 80% of the individual basin populations. No data were reported for the three least populous basins, which are the North Platte, Rio Grande, and White River.

[3] The Metro Region is physically located within the South Platte River basin but is typically summarized separately for SWSI reporting purposes. Unless otherwise indicated, the South Platte basin includes the Republican River sub-basin but excludes the Metro Region.

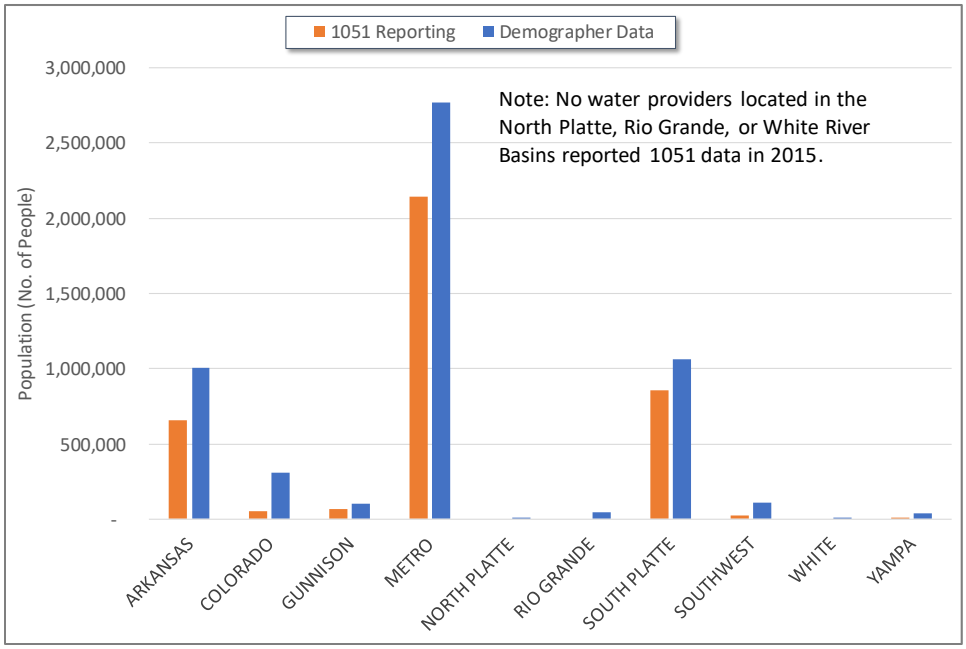


**Figure 1. Comparison of Population Represented by 1051 Reporting and State Demographer Population for the Year 2015.**

## 1051-Reported Water Production and Demands

It is necessary to understand the types of water supplies and end uses of water when evaluating water use and conservation programs. On a statewide average basis, 92% of the 1051-reported water production data is associated with potable water supplies, 6% is non-potable raw water, and 2% goes to non-potable reuse (Figure 2). Many water providers report having no non-potable water supplies and so the non-potable percentages for some individual water providers are much higher, on the order of 50% of the total water production in some years. The non-potable water supplies are often provided to customers under leasing arrangements or as a wholesale water supply.

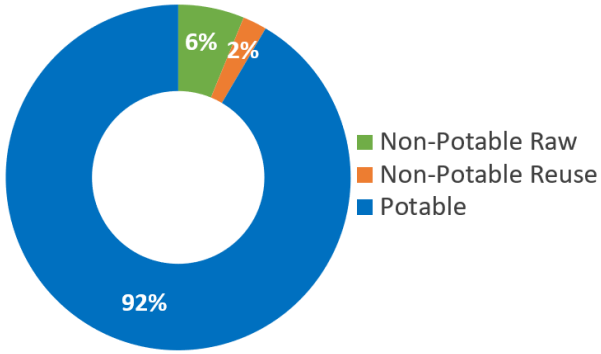


**Figure 2. Statewide Average of 1051 Reporting of Water Production Between 2013 and 2016.**

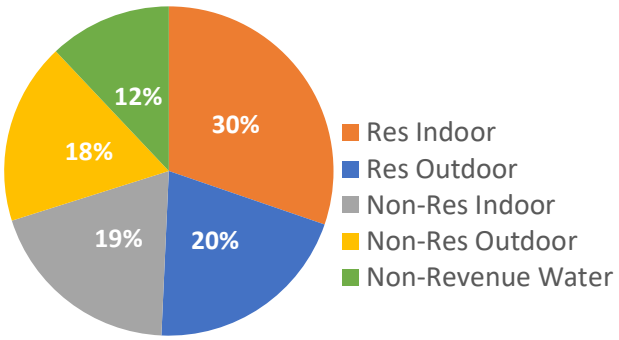


**Figure 3. Statewide Average of 1051 Reporting of Annual Water Demands Between 2013 and 2016.**

The 1051 water use data, obtained from water provider billing data, were summarized into residential and non-residential categories while non-revenue water[4] was calculated as the difference between the reported volume distributed to customers and the total metered, i.e. billed, amounts. The residential and non-residential categories were further disaggregated into indoor and outdoor uses. Some municipal water systems separately meter indoor and outdoor non-residential demands but most do not separately meter the indoor and outdoor portions of residential demands. The seasonality of uses was approximated from monthly data and other information provided in the 1051 reporting. The average annual results on a statewide scale for the reporting period of 2013 through 2016 is provided in Figure 3 above.

The average annual total volumetric and per capita water demands for each basin are provided in Figures 4 and 5 below, respectively. The values in these figures account for the reported demands associated with potable, non-potable raw, and non-potable reuse water supplies. The raw water and reuse water are typically attributable to the non-residential outdoor demand category but in some locations are also associated with residential outdoor uses.

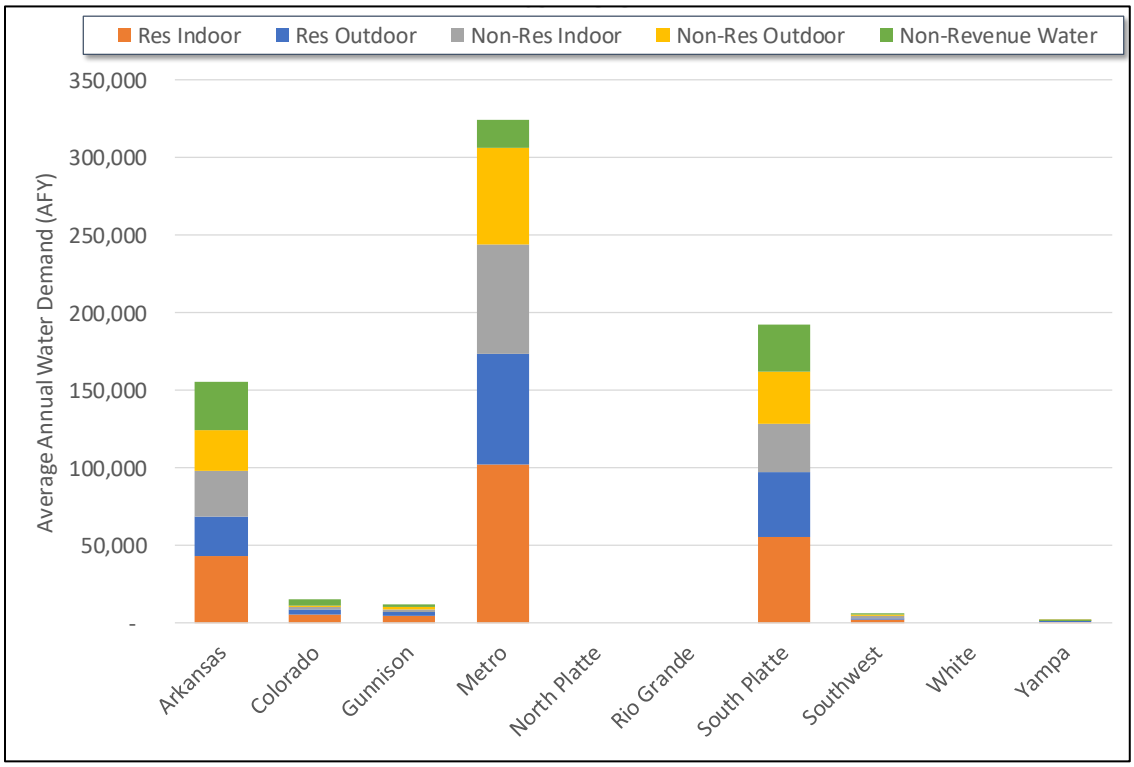


**Figure 4. Average Annual Volumetric Water Demands in 1051 Reporting Between 2013 and 2016.**

[4] Non-revenue water is produced and then unbilled or "lost" before it reaches the customer. Losses can be real physical losses or apparent losses, such as through metering inaccuracies.

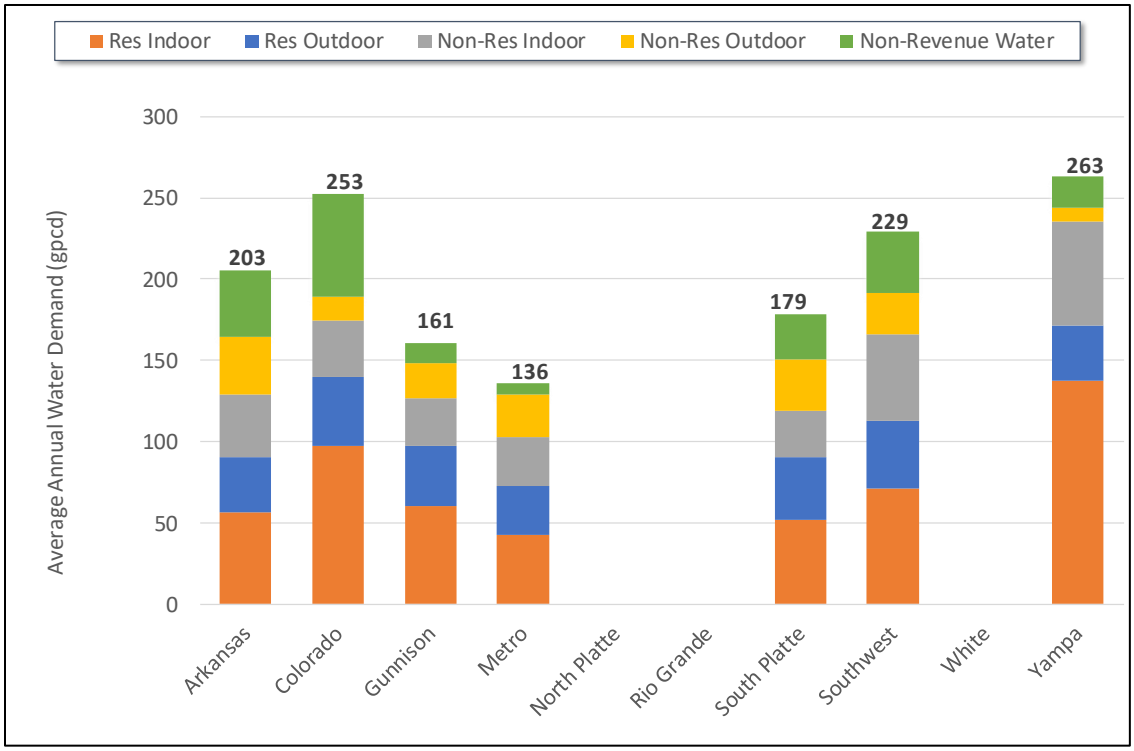


**Figure 5. Average Annual Per Capita Water Demands in 1051 Reporting Between 2013 and 2016.**

When reviewing the information in Figures 4 and 5, it is important to keep the following in mind:

- The demands shown in these figures account for approximately 70% of the statewide population.
- The data shown in Figure 4 account for a little over 60% of the estimated statewide demands included in the SWSI Update baseline.
- Some of the per capita demand values shown in Figure 5 are significantly higher than the values used for the SWSI Update baseline. The SWSI analysis incorporates additional data from Water Efficiency Plans, Basin Implementation Plans, and water provider outreach.
- The data represent current demands for an average year. Data trends and relationships, such as between outdoor water use and weather, were investigated for the SWSI Update and these analyses will become more meaningful as additional years of 1051 data become available.

### Non-Revenue Water

The non-revenue water values shown in Figures 3 through 5 above represent a subset of the 1051 reported data, after filtering results to exclude negative and unreasonably high non-revenue water values. There is wide variability in the calculated non-revenue water values across water providers and between 1051 reporting years for a given provider. A more complete dataset of calculated non-revenue water values is shown in Figure 6 below. Negative values result from billed water use data exceeding the total distributed water, which physically defies the laws of mass balance and indicates an issue with one or both data sources. These data moved the CWCB to create the Colorado Water Loss Initiative, providing water loss training and technical assistance for urban water systems across Colorado (see www.coloradowaterloss.org).

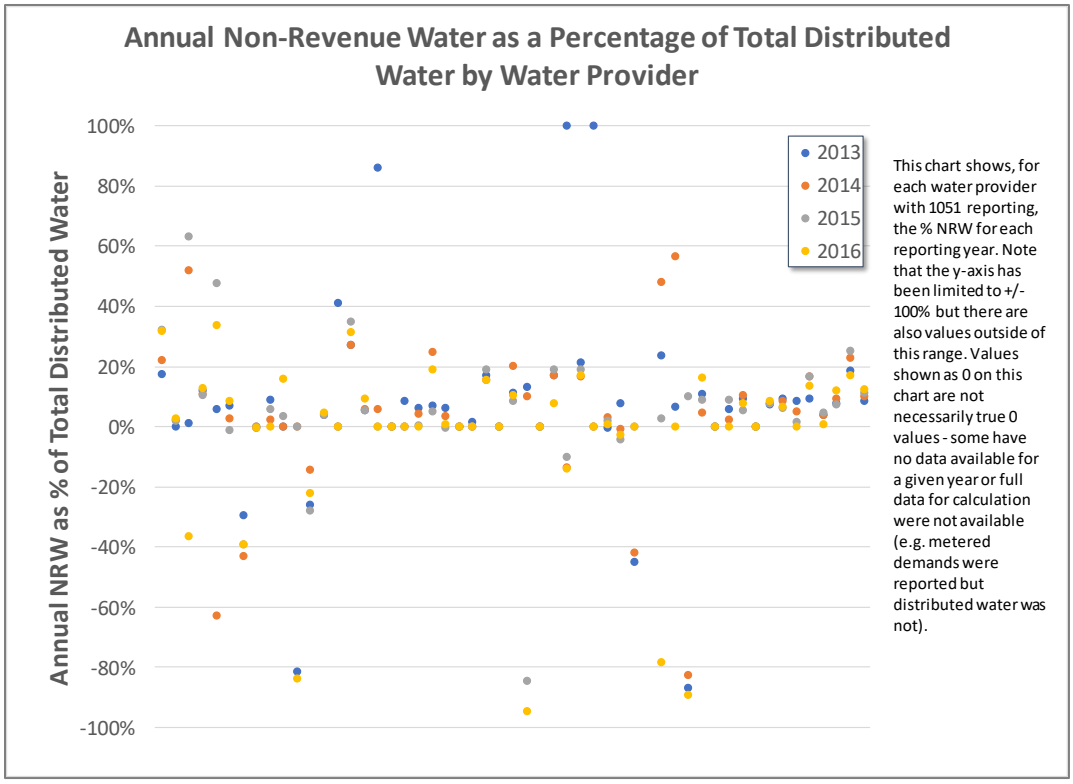


**Figure 6. Annual Non-Revenue Water as a Percentage of Total Distributed Water by Provider in 1051 Reporting Between 2013 and 2016.**

## Recommendations for Future Reporting

The current SWSI Update is the first time the 1051 data has been systematically analyzed and used on a statewide scale. Through these extensive analyses, some 1051 data issues were identified, and data corrections were made accordingly to produce a working dataset for the SWSI Update. However, the 1051 database was not modified. The CWCB will work with water providers to review the identified data issues and in updating the 1051 database, to help improve the data reliability for future analyses. Additional error notices and flags prompting the data portal users to check suspect data may also help improve the quality of the reported data.

While all the reporting categories in the 1051 data portal are relevant, some are more essential than others in preparing statewide and basin-scale demand projections for the Colorado Water Plan, SWSI, and associated basin planning efforts. These types of analyses are most dependent upon reliable water production, water use, and normalizing data. The following recommendations are provided with respect to the reporting process for these specific data:

- Require further explanation for any water supply category in which the total production minus exported water does not exceed the sum of the metered water uses by some threshold amount.
- Expand the user-reported explanations about exported water and how it relates to production and metered water use. More specificity is needed about wholesale-related water supplies and demands to verify whether the associated demands may inadvertently be represented in the exported water category.

- Require a description for any uniquely created service connection categories, an association with residential or non-residential demands, and an estimate of the seasonality (indoor versus outdoor) of the usage.
- Emphasize the importance of irrigated area information as a normalizing parameter for outdoor use analyses. Without this information, it is challenging to evaluate the efficiency of outdoor uses.

While these recommendations are offered to help improve the reporting process and ultimately the quality of the data, the unique characteristics of each water supply system and the changing uses throughout each service area make it impossible to prepare a truly uniform statewide reporting system. Ongoing data validation and correspondence with reporting entities to resolve unique data issues will be prioritized and will become easier as trends are more apparent with additional years of reported data.

## Conclusion

The 1051 data has proven to be invaluable for statewide water planning and will improve over time as more years are accumulated. The current SWSI update improved significantly with the use of this data and the upcoming Basin Implementation Plans will benefit as well. Additionally, the CWCB will analyze water demand trends over time in order to apply those trends to the Colorado Water Plan goal of 400,000 acre feet of water conservation by 2050 and other municipal water demand-related goals. With the use of consistent annual water use and water conservation data, water demand forecasting has become more accurate and will continue to advance over time.