# Cambria Water Demand Report – DRAFT (updated 10-11-19)

## I. Introduction and Summary

The Resources and Infrastructure Committee of the Cambria Community Services District has created an ad hoc committee to analyze water demand in Cambria and to assess the adequacy of current data for forecasting demand in the future. The following report is being presented by the three committee members – Karen Dean, Brad Fowles and Tom Gray – in response to this request.

This report is not intended to supersede the CCSD's Urban Water Management Plan, most recently updated in 2015 and due for its next update in 2020. What we attempt here is a close-up look at past and present patterns in water usage in Cambria, based on the data available at this point. We also seek to identify data gaps that need to be filled before a reasonably reliable forecast can be made.

Careful forecasting of water demand is critical to the CCSD as it decides how to provide a reliable water supply in all conditions, including extended droughts, for the community's residents. In light of potential future growth in water connections, it is especially important to have a clear picture of water use on a per-capita and per-connection basis. The CCSD needs to be able to estimate, for instance, what the addition of a certain number of connections and/or full-time residence would do to overall water demand.

Demand forecasting also needs to focus not just on annual totals but on demand in the dry half of the year, the months from May through October. This is the time when water use is highest and when shortfalls are likely to occur. For that reason we break out usage data for both dry and wet seasons, based on CCSD billing data since 2003.

Billing data, while not precisely reflecting actual water use, is the best source we have at present to measure consumption and identify short-term trends. Water production records give a longer-term view, but they can vary widely from billed-use totals and thus need to be used with caution in forecasting. We have drawn on both of these sources for most of our analysis.

We also have used available Census data to analyze per-capita use. Here we have identified several challenges. First, much of the data, especially the most recent, comes from surveys with large margins of error. Second, Census data on housing units does not make distinctions, such as between full- and part-time residency, that are crucial to forecasting residential water use in Cambria. Finally, we are on the eve of a new decennial Census (in 2020) that may show a shift in demographic and housing trends that will force us to reassess assumptions based on the numbers from 2000 and 2010.

We identify a number of areas that need further analysis and/or current data. One is the CCSD's demand offset program, in which data has not been updated for several years. Others are the question of full vs. part-time residency rates, the potential impact of

accessory dwelling units (ADUs), demographic trends, future commercial water use, water usage trends in landscape irrigation, and the success of efforts to close the gap between production and billed use.

We view this report as a summary of what we know at present and what we need to find out before making credible statements about the future. Our aim is to help the CCSD develop a solid foundation of knowledge for demand forecasts such as those in the 2020 update of the Urban Water Management Plan.

## II. Review of the Data

### *1) Cambria's Water Usage Today*

In the latest full year (2018), CCSD customers of all types were billed for use of 468.5 acre-feet. Total water production was 535.9 acre-feet. The difference between production and billing was 67.5 acre-feet, or 12.6% of production.

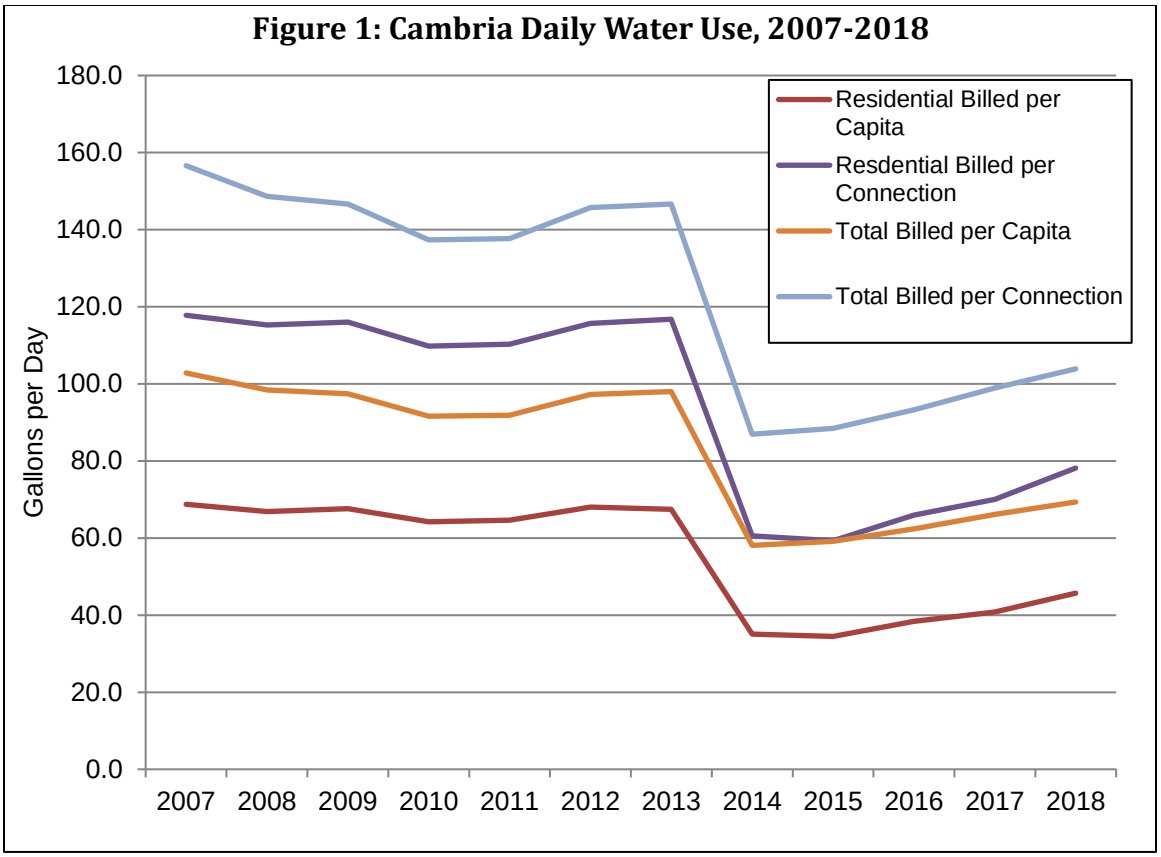
Of the total billed water consumption, **residential** use accounted for **309 acre-feet**, or 66% of the total. **Commercial** use was **129.3 acre-feet**, or 27.6% of the total, with another 22.3 acre-feet (4.8%) consumed by licensed vacation rentals. Commercial and vacation-rental use comes to 32.4% of the total. The remaining 7.9 acre-feet (1.7%) is billed to CCSD internal accounts.

Two numbers -- per capita use and use per connection -- are especially important in forecasting.

*Per capita:* Based on the 2010 Census population of 6,032, per capita billed use for all categories is .078 acre-feet (25,444 gallons) per year, or 69.7 gallons per day (gpd). Total *residential* per-capita use is .052 acre-feet per year, or **46.0 gpd.**

*Per connection:* Based on a total of 4,031 connections (at mid-year), total billed use per connection is .116 acre-feet per year, or 103.7 gpd. Residential use alone (excluding commercial, vacation-rental and internal use categories) is .088 acre-feet a year per connections, or 78.1 gallons per day, based on 3,531 connections.

These per capita and per connection figures for 2018 are all significantly below pre-2013 levels, showing the dramatic effects of conservation efforts during the 2013-2016 drought They have shown a modest upturn since bottoming out in 2015, but they still remain about 30% below 2013 levels (see Figure 1, which covers the 12 years for which the CCSD has billing records for residential customers only).




(**See also Table 1: Annual Billed Use by Category, 2007-2018)**

Cambria's water use also is low compared to other communities in the Central Coast region, not to mention California as a whole. According to monthly data from the State Water Resources Control Board (https://www.waterboards.ca.gov/water_issues/programs/conservation_portal/conservation_reporting.html), per capita residential water use on the Central Coast averaged 70.1 gpd in 2018 – more than 50% above Cambria's 46.0 gpd.

We have found no current data showing how much water *full-time* residents use on a per-capita basis. But we can infer that full-timers on average use somewhat less than 46 gpd per capita, because the CCSD's "residential" category includes connections for part-time residents (who are not included in the total population figure of 6,032) as well as full-time residents. The Census Bureau's 2017 American Community Survey classifies 33% of Cambria's housing units as "vacant." This includes active vacation rentals and units for sale or rent that are truly unoccupied, but it also includes the large number of units – possibly a fifth of total units – that are occupied part-time. How much water these units use depends on how often the part-time residents occupy them, and we have no information on the average length of stay. See "Questions for Forecasting" below for more on this topic.

As with residential water use throughout the state, Cambria's water use follows a clear seasonal pattern. From May through October, normally a time with little or no rain, residential use (based on a 2007-2018 average) is 61.1 GPD per capita. (**See Table 2: May-Oct. Billed Use by Category, 2007-2008).** This is 10.7% above the 55.2 gpd per capita annual average from the same 12-year period, and 24.2% above the 49.2 gpd average for November through April. The summer upsurge is likely due both to landscape irrigation in the dry season and (possibly) more summer use of part-time residences.

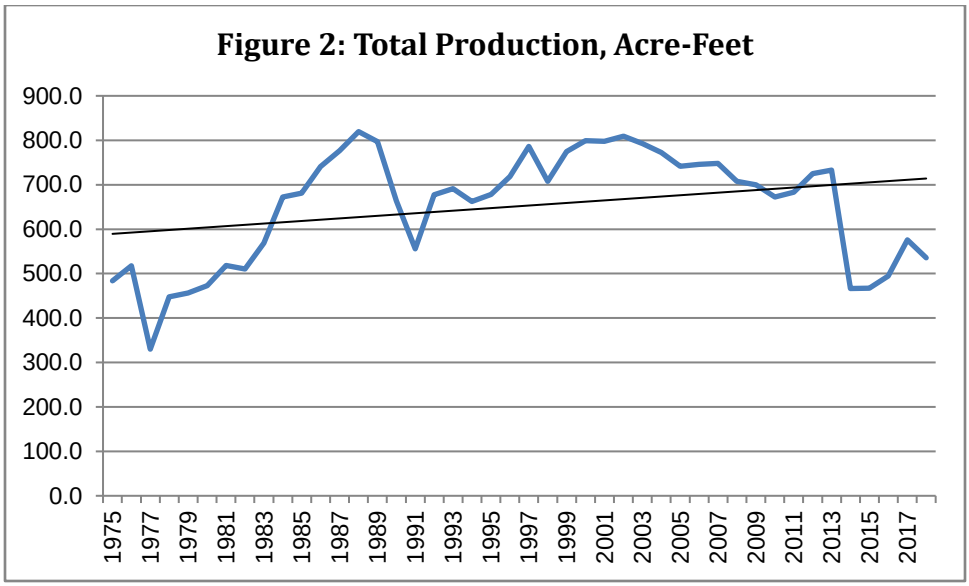
Commercial use shows a larger upsurge in the dry season. The rate per commercial connection jumps from 453.6 gpd in the rainy season to 616.5 gpd in the May-to-October period, an increase of 35.9%. The difference is presumably due mainly to higher tourism in the summer months.

***2) A Longer View of Cambria's Water Usage***

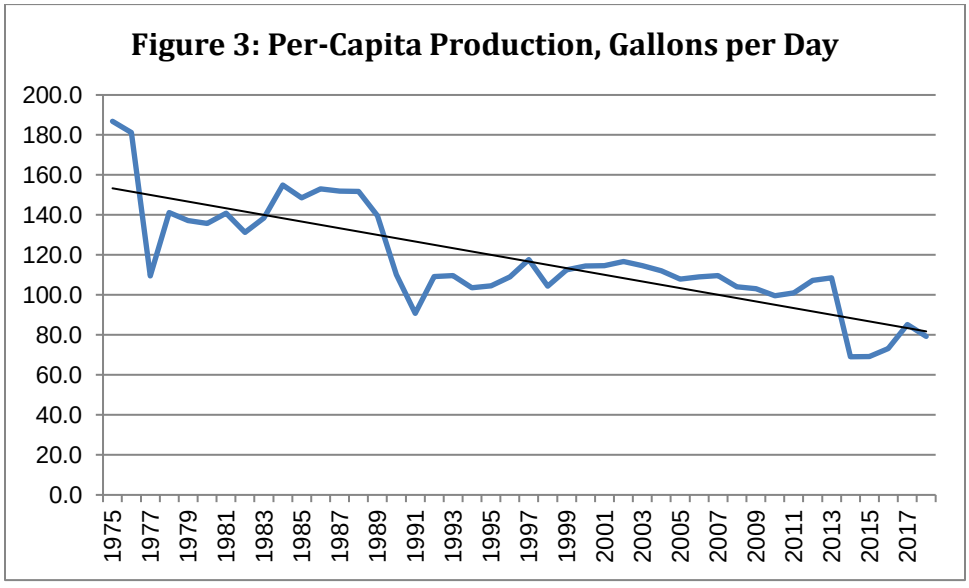
Looking at long-term trends, we have annual water production data covering 44 years, from 1975 through 2018. Billed use records cover 33 years, from 1988 to 2018. Per capita usage figures are available for both periods, and records for usage per connection (not categorized in earlier years) date to 1991. (**See Table 3: Historical Water Production and Billed Use: 1975-2018)**.

These data series show two patterns that are important in forecasting future use. One is a long-term decline in per capita or per-connection water use. The other is a sharp drop in water use during extreme droughts, followed a partial recovery.

In the earlier years of the production record (until about 2000), the decline in per capital use was masked by population gains, which were especially dramatic in the 1970s and 1980s. This is why total production from 1975 (see Figure 2) shows a gradual rise overall. Even here, though, the most recent production totals are comparable to those from about 35 years before, when Cambria's population was about two-thirds what it is now.




Per-capita production (Figure 3) shows a significant decline, even before the most recent drought. The chart also shows how water use fell dramatically in each of the three severe droughts in this period – in 1976-77, 1988-91, and 2013-2016 – and then retraced some, but not all, of the drop in demand.




Sources for long-term production and billing data: "A Review of Water Use & Water Management Alternatives in Cambria, California," by James Fryer, June 2012; CCSD billing and production records.

Based on the production records for the two earlier droughts, it appears that the full recovery of demand takes place over roughly seven years after demand bottoms out. From 1977 to 1984, for instance, per capita production went from 109.4 gpd to 155 gpd, after which it held steady and eventually fell. This 42% rise, however, retraced only

about 59% of the drop during the drought. In other words, the drought led to a permanent reduction of demand, amounting to about 20% of pre-drought production.

The pattern is the same for the drought that started in 1988, with demand hitting a low point in 1991. Per capita production fell 40%; per capita billed use fell 42%. By 1997, demand and billed use had reached a new plateau and were starting a gradual decline. But this new high point was still about 22% below the pre-drought peak in 1988. Billed use peaked a few years later, in 2001, but was even then about 25% below 1988.

In the most recent drought, demand hit bottom in 2014, with per capita production falling 36%, from 108.5 gpd to 69.1 gpd. Residential per-capita use hit its lowest point in 2015, plummeting 49% from 67.5 gpd to 34.5 gpd. In 2018, per capita production had rebounded only to 79.3 gpd, still 27% below the pre-drought peak. Per capita residential use had rebounded to 45.7, or 32% below the 2013 level.

If the past pattern holds, we can expect two or three years of recovering demand, though at a much slower pace than we saw after the drought was declared over and Stage 3 restrictions were lifted in 2017. The next peak, followed by a plateau or gradual decline, would occur in 2021 or 2022, and it would leave production and residential use at no more than 80% of prior peak levels. That would put per capita production at 86.8 gpd and per capita residential use at 54.0 gpd.

The dry-season demand pattern in the recent drought was more pronounced than the annual pattern, but its general shape was the same. From a 2013 level of 121.7 gpd, per capita production in the May-October period fell 42% to 70.1 gpd and had rebounded to 85.4 gpd by 2018, still 30% below the prior peak. Per capita residential use plummeted 56%, from 75.0 gpd in 2013 to 33.0 gpd in 2014. At 50.3 gpd in 2018, it was still 33% below 2013.

***3) Water Rates and Other Conservation Factors***

There are several possible reasons why per capita water use has declined over the years and tends to stay well below prior levels after a major drought.

One is behavior change. In a drought severe enough to warrant strict restrictions over a substantial period, people learn to use less water for daily activities and, up to a point, get used to more frugal practices such as shorter showers. Another factor is replacement of high water-using appliances or landscaping with more water-thrifty alternatives such as low-flow toilets, more efficient washing machines and drought-tolerant trees, shrubs and ground cover.

Rising water rates can also lead to permanent reductions in demand. Various economic studies of the impact of rates on consumption note that higher rates lead to significant reduction in demand over the long run. For instance, one comprehensive study of households in 11 U.S. and Canadian urban areas suggested a “price elasticity” of -0.33 in

water demand. This means that, for every doubling of water rates (a 100% increase), demand falls by 33%.[1]

In Cambria, bimonthly water rates have more than doubled since before the latest drought, and they are due for a further increase in 2020. For a household consuming six units (600 cubic feet or 4,488 gallons) every two months, the marginal cost of one unit has gone from $7.99 in 2012 to $20.37 today, a rise of 155%. It is due to increase further to $22.01 next year. What this means is that, whereas a typical CCSD customer saved just under $8 (every two months) by reducing use by one unit seven years ago, the same customer saves $20.37 (or $122.22 a year) from the same cut in consumption. This is an especially significant amount of money for people living on modest incomes.

## III. Questions for Forecasting

### a) Will demographic factors change?

Census data from the past two decades (from the Bureau's American Community Survey reports as well as the decennial Census) tell a consistent story about Cambria. Its population is significantly older than the state average, with a median age estimated at 61.5 in the 2017 American Community Survey. (The statewide median in that same survey is 36.5). Its economy is based mainly on tourism; 57% of its workforce, according to a 2012 Census survey, is employed in "accommodation and food services." To put this data in simple terms, retirees and near-retirees are the dominant group among Cambria's residents, and visitors provide a living to most of its workers.

The future of these demographic factors has important implications for forecasting water demand. For instance, a shift toward lower median ages might point toward a rise in younger, larger households, replacing retiree households with one or two occupants. This would lead to a higher occupancy rate per residential water connection, and higher water consumption as a result.

### b) What about the part-timers?

As we noted above, the 2017 American Community Survey records 33% of Cambria's housing units as "vacant," up from 25% in 2000. This is a broad category that includes units occupied part-time, as well as those used as vacation rentals, awaiting rental or sale, and simply empty.

What is not known from Census data is how much of the overall residential water demand comes from part-timers. This is a significant gap in the knowledge needed for forecasting. Currently, in calculating per-capita demand we have only 1) the population of Cambria (i.e., full-timers) and 2) the consumption per residential water connection. But a significant number of those water connections are used by part-timers, who are not included in the population figure. So per-capita demand is overstated to some degree.

This is not a problem if we assume that the mix of full-time and part-time occupancies will not change in the future. But change in either direction could make a major difference in future water use. For instance, if the vast majority of future new homes are occupied full-time, per-capita demand would be higher than at present. Demand would also rise if the trend toward greater part-time occupancy reverses and more existing homes are occupied full-time.

By our calculations based on the 2010 Census, about 20% of all housing units are occupied part-time.[2] However, the share of water *consumption* by these homes is impossible to estimate without knowing the average time that part-timers spend in Cambria.

**c) Now will ADUs affect demand?**

The encouragement by state and local governments of accessory dwelling units (ADUs) as a form of affordable housing adds an element of uncertainty to future demand calculations. These units are small structures added to existing residential parcels to provide additional full-time housing units. Under the San Luis Obispo County ordinance being considered for these, the CCSD would have to certify that adequate water is available for them. However, it is not clear if an additional water *connection* would be required.

ADUs added to existing water connections (or added to future water connections for a conventional single-family home) could significantly increase the number of users per connection and hence the per-connection demand. The CCSD needs to get as clear a picture as possible of how many ADUs might ultimately be built and how this would affect its demand forecasts.

**d) How much of a difference will demand offsets make?**

In past forecasting, the CCSD has said that conservation measures could actually lower overall water demand even under full build-out (4,650 residential units). These would include retrofitting of existing construction as well as added requirements (such as dual plumbing and no outdoor use of potable water) on new construction.[3]

To put this assertion to the test, the CCSD needs to know how well its conservation programs have worked up to now, and to know how much potential they have to save water in the future. In existing construction, for instance, future savings through demand offsets depend on how much older, less efficient plumbing fixtures and appliances remain in use. In new construction as well as old, the CCSD needs to consider the uncertainties surrounding technologies, such as the use of gray water for residential irrigation, that have not been widely adopted and do not have an extensive track record of reliability. The first step toward ascertaining Cambria's conservation potential is to update the data and projection in the CCSD's demand-offset programs.

**e) How much potable water will be used for landscape irrigation?**

We can assume that much of the demand drop in the recent drought came from residents cutting back on outdoor irrigation, as well as a significant number of them buying irrigation water from non-CCSD sources. The future trend is less clear.. For instance, it is possible that many of the residents now buying non-potable water will switch to the potable CCSD water, which is still the cheaper option. On the other side of the ledger, changes in landscaping, such as a shift to drought-tolerant plantings, may hold demand down for the long term.

To get a better idea of how much these trends might affect future demand, the CCSD needs to get a clearer idea of how much potable water is used for landscaping now. It might start by comparing water usage with wastewater production during different billing periods of the year.

**f) Will commercial maintain its share of the total?**

Billed water use in the commercial category, which includes visitor-serving lodging and restaurant businesses as well as businesses that primarily serve residents, was 27.6% in the latest full year (2018). With vacation rentals added, total use came to 32.4%. These are higher figures than those from the pre-drought years, when commercial use averaged 23.4% (from 2003 to 2013) and commercial plus vacation rentals averaged 28.1% (from 2007, the first year vacation rentals were a separate billing category).

This shift toward a bigger commercial-plus-vacation rental share appears to be the result of differences in residential and commercial conservation rates during and after the drought. From 2013 to 2015, when water use bottomed out in both categories, residential use fall nearly 49%, from 456 to 232.9 acre-feet, while commercial use fell less than 27%, from 154.3 to 113.1 acre-feet. Vacation rentals dropped by 38%, from 32.8 to 20.2 acre-feet. Since then, however, the conservation gap has closed somewhat. From 2015 to 2018, residential use bounced more than 32% off its 2015 low, while commercial use rose just 14% and vacation rental was up by less than 10%.

For now, then, the ratio of commercial to residential use (with vacation rentals added to the commercial category) seems to be settling back to pre-drought levels. But what will happen to this number if Cambria adds a substantial number of new housing connections? The answer seems to depend on the amount and type of new business in Cambria. New visitor-facing development, especially lodging, would increase commercial use quite a lot, new retail business probably less.

**g) Will the production/usage gap shrink?**

In forecasting production, the most difficult number to pin down is the annual gap between water produced and water use billed. In the past 31 years, this gap has ranged from as high as 140.2 to as low as 38.6 acre-feet. It does not correlate clearly to demand.

so it is probably due largely to leakage, which in a pressurized system will occur whether or not people open their taps. However, the age and condition of water meters also can make a difference, with older meters tending to err on the down side.

The average production-billed use gap in the past 12 years is 65.8 acre-feet per year. But even in that short period the annual number has ranged from 38.6 to 129.2 acre-feet. To put those numbers in perspective, the 2007-2018 average billed water use per residential connection was just 0.106 acre-feet a year. So a reduction of 10 acre-feet in water loss is equivalent to the water used by nearly 95 homes. (And this is based on an average including both pre- and post-drought years).

We assume that the CCSD will continue its efforts to reduce water losses. How well it succeeds could have a major effect on forecasting its ability to meet new demand.

## Table 1: Annual Billed Use by Category, 2007-2018

| | Residential | | | | Vacation Rental | | | Commercial | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | (A) | Billed Use (AF) | Billed Use, GPD per Connection | Billed Use, GPD per Capita | (A) | Billed Use (AF) | Billed Use, GPD per Connection | (A) | Billed Use (AF) | Billed Use, GPD per Connection |
| 2007 | 3555 | 469.0 | 117.8 | 68.7 | 225 | 31.0 | 122.8 | 223 | 158.5 | 634.4 |
| 2008 | 3523 | 454.8 | 115.3 | 66.9 | 251 | 32.1 | 114.3 | 226 | 150.2 | 593.2 |
| 2009 | 3526 | 458.4 | 116.1 | 67.6 | 242 | 33.5 | 123.4 | 227 | 145.7 | 573.1 |
| 2010 | 3528 | 433.9 | 109.8 | 64.2 | 241 | 31.5 | 116.7 | 228 | 144.3 | 565.1 |
| 2011 | 3535 | 436.6 | 110.2 | 64.6 | 246 | 30.0 | 108.8 | 229 | 147.3 | 574.2 |
| 2012 | 3545 | 459.5 | 115.7 | 68.0 | 236 | 30.5 | 115.4 | 229 | 150.9 | 588.1 |
| 2013 | 3471 | 456.0 | 117.3 | 67.5 | 308 | 32.8 | 95.1 | 229 | 154.3 | 601.3 |
| 2014 | 3489 | 237.0 | 60.6 | 35.1 | 291 | 22.0 | 67.5 | 229 | 119.1 | 464.3 |
| 2015 | 3423 | 232.9 | 60.7 | 34.5 | 278 | 20.2 | 64.9 | 229 | 113.1 | 440.8 |
| 2016 | 3513 | 259.6 | 66.0 | 38.4 | 267 | 21.4 | 72.6 | 229 | 119.2 | 464.8 |
| 2017 | 3515 | 275.8 | 70.0 | 40.8 | 266 | 22.6 | 75.8 | 228 | 123.2 | 482.5 |
| 2018 | 3531 | 309.0 | 78.1 | 45.7 | 249 | 22.3 | 80.0 | 228 | 129.3 | 506.2 |
| *12-YEAR AVERAGES* | *3513* | *373.5* | *94.8* | *55.2* | *259* | *27.5* | *96.3* | *228* | *137.9* | *540.7* |

## Table 2: Dry Season (May-Oct.) Billed Use by Category, 2007-2018

| | Residential | | | | Vacation Rental | | | Commercial | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | (A) | Billed Use (AF) | Billed Use, GPD per Connection | Billed Use, GPD per Capita | (A) | Billed Use (AF) | Billed Use, GPD per Connection | (A) | Billed Use (AF) | Billed Use, GPD per Connection |
| 2007 | 3555 | 266.9 | 133.0 | 77.6 | 225 | 17.4 | 136.7 | 223 | 91.9 | 729.7 |
| 2008 | 3523 | 257.2 | 129.3 | 75.0 | 251 | 19.4 | 138.0 | 226 | 88.9 | 696.9 |
| 2009 | 3526 | 256.6 | 128.9 | 75.1 | 242 | 19.6 | 144.2 | 227 | 85.1 | 664.0 |
| 2010 | 3528 | 250.5 | 125.7 | 73.5 | 241 | 19.0 | 140.6 | 228 | 85.9 | 667.0 |
| 2011 | 3535 | 246.1 | 123.3 | 72.3 | 246 | 17.5 | 126.8 | 229 | 87.8 | 678.9 |
| 2012 | 3545 | 261.0 | 130.4 | 76.6 | 236 | 18.0 | 135.8 | 229 | 90.5 | 699.9 |
| 2013 | 3471 | 255.4 | 130.3 | 75.0 | 308 | 22.1 | 128.1 | 229 | 93.2 | 720.7 |
| 2014 | 3489 | 112.6 | 57.1 | 33.0 | 291 | 11.3 | 69.3 | 229 | 61.7 | 477.2 |
| 2015 | 3423 | 119.4 | 61.8 | 35.1 | 278 | 11.3 | 72.6 | 229 | 60.9 | 471.0 |
| 2016 | 3513 | 139.9 | 70.5 | 41.1 | 267 | 12.5 | 83.7 | 229 | 65.1 | 503.5 |
| 2017 | 3515 | 162.4 | 81.8 | 47.7 | 266 | 13.6 | 91.0 | 228 | 68.3 | 530.3 |
| 2018 | 3531 | 171.2 | 85.9 | 50.3 | 249 | 12.7 | 90.8 | 228 | 74.1 | 575.6 |
| *12-YEAR AVERAGES* | *3513* | *208.3* | *105.0* | *61.1* | *258* | *16.2* | *111.8* | *228* | *79.5* | *617.9* |

Notes to Tables 1 and 2 --

(A): Connections at mid-year (May-June billing period) except Sept.-Oct. in 2017
GPD: Gallons per day
AF: Acre-feet
Internal accounts not included

## Table 3: Historical Water Production and Billed Use, 1975-2018

| | Production | Billed Use | Production Minus Billed Use | Production Minus Billed Use (% of Production) | Population | GPCD* Production | GPCD* Billed Use |
|---|---|---|---|---|---|---|---|
| 1975 | 483.4 | | | | 2310 | 186.8 | |
| 1976 | 517.8 | | | | 2552 | 181.1 | |
| 1977 | 330.0 | | | | 2692 | 109.4 | |
| 1978 | 447.5 | | | | 2831 | 141.1 | |
| 1979 | 456.4 | | | | 2971 | 137.1 | |
| 1980 | 473.1 | | | | 3110 | 135.8 | |
| 1981 | 518.5 | | | | 3285 | 140.9 | |
| 1982 | 510.6 | | | | 3471 | 131.3 | |
| 1983 | 568.4 | | | | 3666 | 138.4 | |
| 1984 | 672.4 | | | | 3873 | 155.0 | |
| 1985 | 681.0 | | | | 4091 | 148.6 | |
| 1986 | 740.6 | | | | 4322 | 153.0 | |
| 1987 | 777.0 | | | | 4566 | 151.9 | |
| 1988 | 819.5 | 725.3 | 94.2 | 11.49% | 4823 | 151.7 | 134.3 |
| 1989 | 797.0 | 715.9 | 81.1 | 10.18% | 5095 | 139.6 | 125.4 |
| 1990 | 663.8 | 586.8 | 77.0 | 11.60% | 5382 | 110.1 | 97.3 |
| 1991 | 555.7 | 473.2 | 82.5 | 14.85% | 5462 | 90.8 | 77.3 |
| 1992 | 677.7 | 537.5 | 140.2 | 20.69% | 5543 | 109.1 | 86.6 |
| 1993 | 691.4 | 570.4 | 121.0 | 17.50% | 5625 | 109.7 | 90.5 |
| 1994 | 662.1 | 597.7 | 64.4 | 9.73% | 5708 | 103.6 | 93.5 |
| 1995 | 677.8 | 601.0 | 76.8 | 11.34% | 5792 | 104.5 | 92.6 |
| 1996 | 718.3 | 642.8 | 75.5 | 10.50% | 5878 | 109.1 | 97.6 |
| 1997 | 785.8 | 646.0 | 139.8 | 17.79% | 5965 | 117.6 | 96.7 |
| 1998 | 707.5 | 614.3 | 93.2 | 13.17% | 6053 | 104.3 | 90.6 |
| 1999 | 774.6 | 668.5 | 106.1 | 13.70% | 6142 | 112.6 | 97.2 |
| 2000 | 798.8 | 687.2 | 111.6 | 13.97% | 6232 | 114.4 | 98.4 |
| 2001 | 797.9 | 693.2 | 104.7 | 13.13% | 6212 | 114.7 | 99.6 |
| 2002 | 809.5 | 700.1 | 109.4 | 13.51% | 6191 | 116.7 | 101.0 |
| 2003 | 792.9 | 698.5 | 94.4 | 11.90% | 6171 | 114.7 | 101.1 |
| 2004 | 772.6 | 659.4 | 113.2 | 14.66% | 6151 | 112.1 | 95.7 |
| 2005 | 741.2 | 643.7 | 97.5 | 13.15% | 6131 | 107.9 | 93.7 |
| 2006 | 746.1 | 688.3 | 57.8 | 7.75% | 6111 | 109.0 | 100.6 |
| 2007 | 748.2 | 701.5 | 46.7 | 6.24% | 6091 | 109.7 | 102.8 |
| 2008 | 707.6 | 669.0 | 38.6 | 5.46% | 6071 | 104.1 | 98.4 |
| 2009 | 699.5 | 660.5 | 39.0 | 5.57% | 6052 | 103.2 | 97.4 |
| 2010 | 672.4 | 619.1 | 53.3 | 7.93% | 6032 | 99.5 | 91.6 |
| 2011 | 682.9 | 620.7 | 62.2 | 9.11% | 6032 | 101.1 | 91.9 |
| 2012 | 724.7 | 657.4 | 67.4 | 9.29% | 6032 | 107.3 | 97.3 |
| 2013 | 733.1 | 662.2 | 70.9 | 9.67% | 6032 | 108.5 | 98.0 |
| 2014 | 466.8 | 392.5 | 74.2 | 15.91% | 6032 | 69.1 | 58.1 |
| 2015 | 467.0 | 399.5 | 67.5 | 14.46% | 6032 | 69.1 | 59.1 |
| 2016 | 494.3 | 421.4 | 72.9 | 14.74% | 6032 | 73.2 | 62.4 |
| 2017 | 575.7 | 446.6 | 129.2 | 22.43% | 6032 | 85.2 | 66.1 |
| 2018 | 535.9 | 468.5 | 67.5 | 12.59% | 6032 | 79.3 | 69.3 |

GPCD: Gallons per capita per day

Sources: CCSD for billed use and production (after 1987); "A Review of Water Use & Water Management Alternatives in Cambria, California" by James Fryer (2012) for production through 1987 and population estimates through 2009; 2010 Census for population after 2009.

The Fryer report compiled totals for annual water production and annual billed water use from annual Public Water System Statistics report filed with the California Department of Water Resources for the years these reports were available.

Endnote 10 in the report (Appendix A, VII) adds: "Some years, including 2005, utilized data from the 2010 Urban Water Management Plan. Annual production from 1975 through 1987 is from CCSD's 1994 Environmental Impact Report, Table 2, p. 3-8. The total number of connections for each year from CCSD's Public Water System Statistics reports when available, and for some of the earlier years from a CCSD Memo from Tammy Rudock to the California Coastal Commission, May 11, 2005, as part of the Pine Knolls Water Tanks Appeal Number A-3-SLO-05-017, Exhibit S, page 6 of 13. The population is from the U.S. census Bureau and averaged for years in between 1970, 1980, 1990, 2000 and 2010. The GPCD for each year is derived from the total annual production and the population."

## Notes:

[1]Sheila M. Olmstead and Robert Stavins, "Managing Water Demand: Price vs. Non-Price Conservation Programs," July 2007, p. 23 (retrieved at http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.371.7705&rep=rep1&type=pdf).
report "Residential Water Use Trends and Implications for Conservation Policy" (https://lao.ca.gov/Publications/Report/3611).

[2]According to the 2010 Census, 4,030 residents live in 1,985 owner-occupied units, and 2,001 residents live in 777 renter-occupied units. Another 1,300 housing units are labeled "vacant. Of these, 242 units are for sale or rent or otherwise unoccupied, and 1,058 "vacant" units are used "for seasonal, recreational, or occasional use." Of these, 228 (according to 2018 CCSD billing records) were active vacation rentals. The remaining 830 are presumably part-time residences, although are known to be occupied virtually full-time by people who maintain legal residences elsewhere.

[3]See, for instance, the 2015 Urban Water Master Plan update, pp. 25, 72-75

## List of Data Sources:

Cambria Community Services District:

1) Monthly water production records from 1988; published monthly in CCSD Board meeting agendas (for latest, see Agenda for Sept. 19, 2019, p. 29: https://www.cambriacsd.org/files/a8b1e2c48/2019+09+19+Amended+2+Regular+Meeting+Agenda+Packet+Posted.pdf

2) Bi-monthly utility summary billing pages from 2003. Data is available online from 2012 to present on "District Financial Information" page at https://www.cambriacsd.org/district-financial-information; earlier reports were provided on request by the CCSD. We would especially like to thank Pamela Duffield for her help in this area.

U.S. Census Bureau:

1) Decennial 2000 Census: "Profile of General Demographic Characteristics, 2000," and "General Housing Characteristics, 2000."

2) Decennial 2019 Census: "Profile of General Demographic and Housing Characteristics, 2010," and "General Housing Characteristics, 2010."

3) "Selected Housing Characteristics, 2013-2017 American Community Survey 5-year Estimates."

4) "Selected Housing Characteristics, 2006-2010 American Community Survey 5-year Estimates."

5) "Economy-Wide Key Statistics, 2012" for Cambria CDP.

All of the above tables are available online at the American Fact Finder website under data for "Cambria CDP" at https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml.

James Fryer, "); "A Review of Water Use & Water Management Alternatives in Cambria, California, " (2012):

Production totals from 1975 through 1987; billed water use totals from 1988 through 2002; population estimates through 2009.
Fryer's report can be retrieved online at the Greenspace website:
https://img1.wsimg.com/blobby/go/150659eb-035a-44f6-8264-ba16acbf6362/downloads/1c4kut79q_530345.pdf?ver=1569870767926