

BOLINAS COMMUNITY PUBLIC UTILITY DISTRICT

BCPUD

BOX 390 270 ELM ROAD BOLINAS CALIFORNIA 94924

415 868 1224



MEMORANDUM

TO: Board of Directors

FROM: Jennifer Blackman *JNB*

RE: Update on Water Supply

DATE: April 20, 2021

This memorandum provides a summary of the status of the District's water supply and current consumption data since the last memorandum to the Board and as of April 19, 2021.

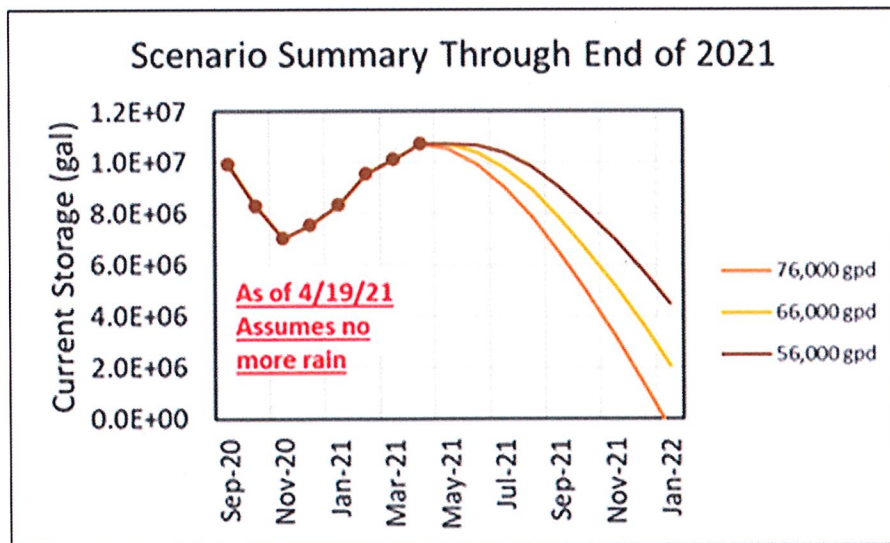
1. Water Supply: From March 20 – April 19, 2021 our diversions from the Arroyo Hondo Creek averaged 65,702 gallons per day; no water was diverted from Woodrat 1 reservoir during this time, once again underscoring the beneficial impact of the community's conservation efforts and also the rain received thus far this rain year. (Note: we did not divert from the creek to the treatment plant during March 16-19 as we were diverting to storage in Woodrat 2).
2. Rainfall: Rainfall received in March 2021 was 2.45 inches; no rain has been received thus far in April. Total annual rainfall in the district (since July 1, 2020) is 16.15 inches. As a reminder, we received 22.7 inches of rain last year. Average annual rainfall received in Bolinas is 32.5 inches.
3. Woodrat 1 and Woodrat 2: Our stored usable water supply in the Woodrat reservoirs as of April 19, 2021 (combined) is 9,926,916¹, an increase of 584,985 gallons in reservoir storage when compared to the 9,341,931 gallons in storage on March 15, 2021 and an increase of 3,105,533 gallons in storage when compared to the 6,833,177 gallons in storage on December 31, 2020. Again, this reflects the beneficial impacts of the community's water conservation efforts (since we have not needed to use reservoir water to meet demand in January, February, March or thus far in April), rain received to date, and diversions to storage directly from the Arroyo Hondo Creek (which were possible for several days in February and March of 2021 due to low consumption and better creek flows resulting from rain events).
4. Water Consumption. From March 16, 2021 – April 19, 2021 water *production* averaged 58,151 GPD or 98 GPD per connection. Water *consumption* during this same timeframe averaged 58,827 GPD, or just under 100 GPD per connection (averaged across the entire district). (Note: *t* production was less than consumption on average during this period because the plant was off for 4 days from March 16th -19th while we transferred water from Arroyo Hondo to Woodrat 2 and water was drawn from treated water storage during this period). As a reminder: during the previous reporting period from February 24 – March 15, 2021, water *production* averaged 55,080 GPD or 93 GPD per connection. Water *consumption* during this same timeframe averaged 54,482 GPD, or 92 GPD per connection (averaged across the entire district). As such, water production and water consumption both increased during the most recent March – April timeframe as compared to the February – March timeframe.

¹ We also had 777,562 gallons of treated water in storage in our East and West tanks (combined) as of April 19, 2021, for a total water storage (treated + raw) of 10,704,478 gallons.

Individual water consumption remains uneven but the highest water users have reduced their use. For example, in March 2021, the highest 12 water users logged an average consumption of 302 to 891 gallons per day, whereas in February the highest 11 water users consumed between 308 to 1403 gallons of water per day. (Water use at the laundromat downtown dropped down much closer to its average historical use during March 2021 at 891 gallons per day.) On the other hand, in March 2021, 29 customers (including the highest 12) used more than 200 gallons of water per day, whereas only 23 customers did so in February 2021; and, in March 2021, 106 customers used more than the anticipated ration amount of 125 gallons per day, whereas only 96 customers did so in February 2021.

5. Updated Models:

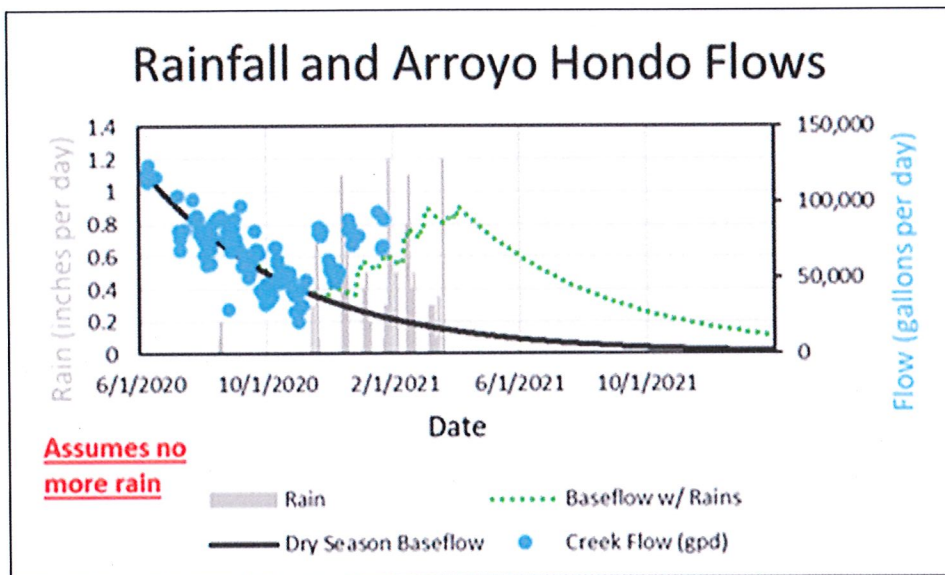
The graph below is an updated Scenario Summary reflecting the actual data recorded as of April 19, 2021 (brown line in upper left area of graph with the eight dots) and the “fork” of projections as to how much stored water the district will have available through 2021 and beyond based on differing rates of overall community water consumption. Whereas water consumption over the March 16 – April 19 timeframe averaged just under 59,000 GPD, the most recent seven-day running average community consumption is approximately 64,000 GPD (because consumption has trended upward), placing the district very close to the yellow line. This graph indicates that if consumption stays at or below current levels, we will have some water available in storage into January 2022. However, if consumption increases to an average of 76,000 gallons per day (which is the mandatory ration “trigger” amount at present), the district will be effectively out of water by some point in December 2021, which is consistent with our projections last month.



Note that the slope of the recorded storage (brown line with dots) has inclined upward since the low point in November 2020, but has flattened somewhat since the February measurement, reflecting the relatively minimal amount of rain received since that time.

While the district’s stored water supply position has improved, reservoir levels remain well-below full (at an overall capacity of approximately 60%), which is highly unusual for this time of year, when the reservoirs typically would be full/spilling.

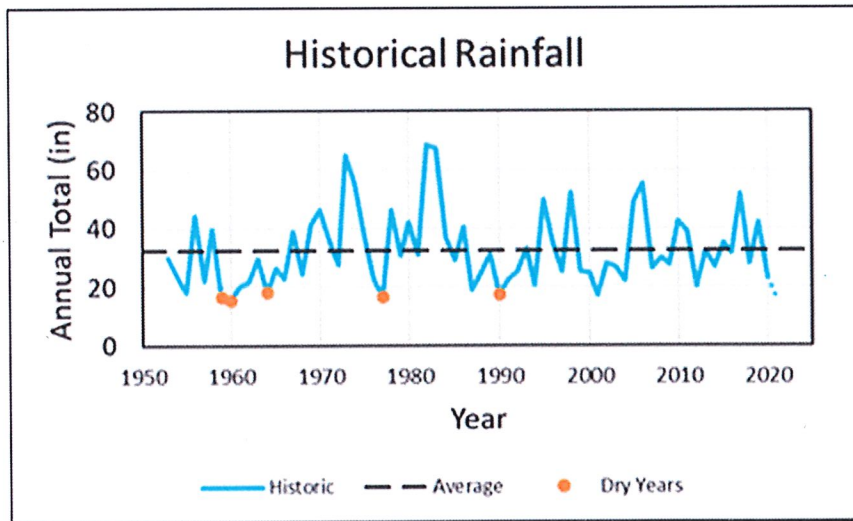
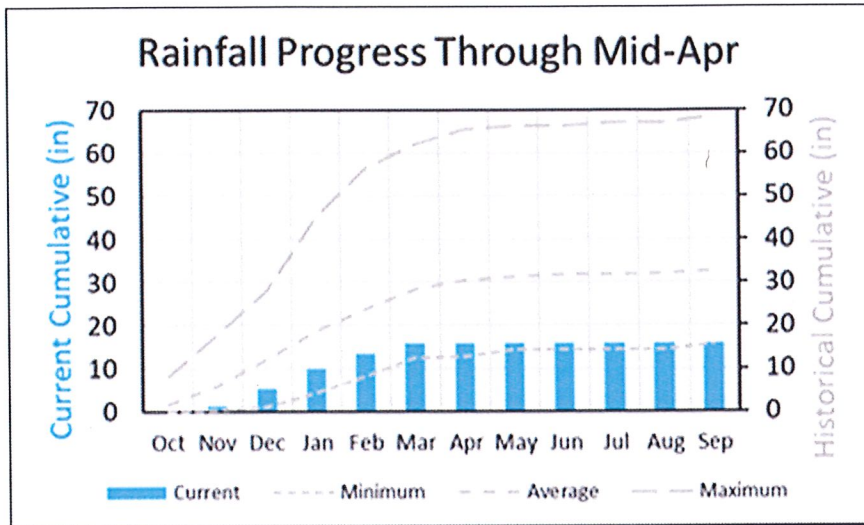
The next graph below is the baseflow recession model² for the Arroyo Hondo creek. There has been no update to the model since the previous memorandum because conditions through April 19, 2021 have not provided additional calibration points. Although creek flows did increase as a result of the rain earlier in the year, this model (created and maintained by the district’s consulting hydrogeologist, Rob Gailey), projects that the beneficial impact of the rainfall on creek flows will quickly dissipate without more rain. *Indeed, this appears to be occurring at the present time. Staff and consultant Gailey agree that the model projections likely are optimistic, meaning that creek flows will decline sooner/more quickly than predicted on the current model. We should have sufficient data to update the recession curve in another month or two.*



The next two graphs depict rainfall received in Bolinas as of April 19, 2021 (15.85 inches from October 1, 2020 – April 19, 2021)³ relative to historic minimum, average and maximum rainfall (68 years of BCPUD rainfall data); as these graphs show, while the district remains above the minimum recorded rainfall for this time of year, its isn’t by much, and rainfall remains well below average.

² The term baseflow recession curve is typically used to describe such a model because the flow decreases, or recedes, with time since the last rainfall event. The effects of recent rains as well as surface flows to the creek (which are not modeled) are indicated. The model currently assumes a 15-day lag between rainfall in the watershed and baseflow response at the creek

³ Note: the BCPUD measures rainfall as of July 1 for each rain year; the models in this memorandum utilize the October 1 start date for the rainy season based on the Water Year as defined by the State. The difference is a negligible 0.3 inches as the district received 0.3 inches of rain in August 2020.



The final graph on the next page correlates the rainfall progress through April 19th of each year with total annual rainfall for the available historical record (preceding 68 years). During that time, the district has experienced only 5 other years where the rainfall received was 15.85 inches or less through the end of April – the specific rain years are indicated in the second graph below as well as on the graph above (orange dots). Those rain years generally turned out to be *much* drier than normal years with a minimum total rainfall received of 15.6 inches, a maximum of 18.4 inches, an average of 17.0 inches and a line of “best fit” projection of 17.7 inches. These statistics suggest there is an extremely high probability at this point that the 2020-21 year will be one of the lowest rainfall years on record.

Important Concluding Note: it appears increasingly likely that, absent any augmentation of the district's water supply via either rainfall or groundwater development, the mandatory daily per connection ration amount of 125 gallons per day per connection enacted by the Board via BCPUD Resolution 680 will need to be adaptively managed (lowered) as it was formulated on the basis of an assumed projected rainfall of 20.7 inches as explained in previous updates.

