

Memorandum

Date: November 17, 2021
To: Diane McBride
From: Greg Weykamp
Subject: Frisco Bay Marina Water Levels Operations Plan

Distribution: Matt Bauer

This memorandum outlines proposed text describing the operational strategy related to water levels that will be communicated to boaters.

Background

As Dillon Reservoir water levels are reliant upon precipitation, snowpack, heat, and customer usage, an operational approach to maximize the function of the Frisco Bay Marina floating docks is required. The Frisco Bay Marina Master Plan, completed in June of 2018, outlined a strategy to allow the floating docks to be moved into the primary location from the winter storage position early in May, and remain in place throughout the boating season. This strategy took advantage of an existing permit and funding source to excavate approximately 75,000 cubic yards of material to create a deeper basin for the marina.

The planning team assessed the current depths and historic water levels to design a new marina basin that maximized the use of the permitted and funded excavation to create the deepest basin possible, which resulted in a basin elevation of 9,000' throughout the main marina area. With this elevation, the floating docks can be moved into place and the marina opened for public use as soon as the water levels reach elevation 9,004'. In most years, historic water level data indicates that the marina could open to the public in early May and remain open through October, which is a significant improvement over years past when the docks were relocated several times throughout the season.



The chart at right indicates the actual water levels from the year 2000 through 2020. While there is the very rare case when the marina could not operate at all at elevation 9,004', the data clearly show that in all cases from the 50th percentile and above, water levels are above the operational elevation 9,004' during the entire boating season. During seasons from the 10th percentile and above, operational water levels are achieved no

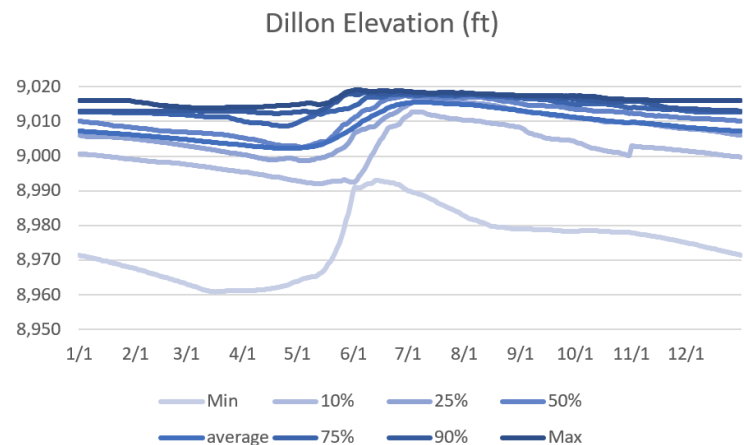
later than mid-May to early June. In other words, the marina could be expected to be operational nearly the entire boating season from May through October 95% of the time.

The Town of Frisco relies on water level projections from Denver Water, and Denver Water relies on the Natural Resources Conservation Service, Colorado Basin River Forecast Center and Missouri Basin River Forecast Center, who have models that integrate snowpack, weather conditions, future precipitation, soil moisture, evapotranspiration and other influencers to predict streamflow. During the 2021 boating season, water level projections suggested that water levels would not remain above elevation 9,004' for a significant portion of the boating season, and the decision was made to leave the floating docks farther out in the water in anticipation of falling water levels. As we are now learning to expect more and more, weather patterns shifted in unanticipated ways and water levels remained high throughout the season. It is very important that we recognize that while water level projections are prepared by a team of highly qualified scientists, hydrologists, and meteorologists, it is not an exact science.

Proposed Operational Approach

While much of the evolving climate change data suggests the likelihood of warmer weather that may reduce snowpack levels, cause earlier melts, and increase evaporation in the future, most of those impacts will take many years to become predictable and reliable weather patterns. What has become more "predictable" now is that our weather patterns are becoming more volatile and less predictable, while still remaining generally within historic water level ranges. For example, in 2021, low snowpack levels suggested a low water year, but later heavier summer monsoons more than made up for the lower snowpack. Similar patterns are occurring elsewhere, such as in the Great Lakes where very heavy spring and summer precipitation are more than offsetting increased evaporation from warmer winters. In other words, until new long term weather patterns become established and predictable, we should be prepared for more volatility in water levels that remain generally within historic ranges.

Beginning with the 2022 boating season, the floating docks will be located in their primary summer location and remain in place year-round for the foreseeable future. The floating docks will be





modified as necessary to allow them to rest on the lakebed when water levels recede below elevation 9,000', and as soon as water levels reach and remain above elevation 9,004', the marina will be open to the public. We expect that the marina will be fully operational in its primary location throughout the boating season from May through October approximately 95% of the time based on historic water levels. During extended periods of low water during the boating season, such as what occurred during the historic drought of 2002, the marina will install mooring balls and provide tenders to facilitate boating.

Marina operations staff will monitor weather patterns and water levels with Denver Water and climate projections from NOAA, and of course monitor conditions within the marina and consider new strategies every five years to adapt the facility to evolving weather patterns. Future adaptations could include additional excavation of materials to allow the marina to operate at water levels below 9,004', or relocation of floating docks farther to the east in deeper water areas. It is important to note that any future excavation projects would require significant capital investment, engineering studies, and permitting to implement. Permanent relocation of the floating dock system to the east towards existing deeper water would also require significant investment and potentially require significant changes to upland infrastructure for utilities, boater services, and access.



Summary

Based on the historic water levels, the marina as currently reconfigured following implementation of the Master Plan and Big Dig projects should remain operational without moving the floating docks during 95% of the upcoming boating seasons. The proposed operational plan to leave the docks in place year round will allow boaters to use the marina for a longer boater season, reduce yearly operational expenses incurred in moving the docks for the winter, and reduce wear and tear on the docks and utilities caused by disconnecting and relocating them every year. During the rare cases where water levels are too low for the facility to operate in place, the marina will install mooring balls to accommodate boaters. We will continue to work with Denver Water to monitor long term climate projections and actual water levels during the boating season and reassess this operational plan to determine if sufficient long term low water patterns indicate the need for structural changes to the marina in the future.
