

Dead River Camper Association Shareholders,

Please find below a timeline starting in January of 2019 showing a high-level overview of how UPPCO has managed water and best attempted to prepare for the summer recreation season on the Dead River Storage Basin (DRSB). UPPCO understands that high water can be a frustrating situation but assures you that we have been actively addressing the water levels while continuing to operate within the FERC (Federal Energy Regulatory Commission) license. UPPCO exercises its best efforts to maintain water levels within more desirable target ranges, however the high amounts of snow and record-breaking spring rains have resulted in water levels near the top of the operating range.

According to the National Weather Service (NWS) we are in the midst of a prolonged record wet period. The 4.23 inches of rain over the weekend of May 18th broke daily records and put us at 7.26 inches of rain for the month of May, which is only 0.65 inches below the 1973 record (as of this document, there are still 8 days left in the month). As of this past weekend, Spring 2019 ranks as the 5th wettest spring on record at 13.40 inches, which is only 2.03 inches off the 1973 record high. The NWS also indicates the extremely wet spring of 2019 follows a very wet 2018-19 winter (11.60 inches, 4th wettest), a very wet 2018 fall (16.05 inches, 4th wettest) and a wet 2018 summer (13.33 inches, 6th wettest). When looking at the past 12 months (June 1st, 2018 – June 1st, 2019) the NWS indicates we have had an incredible 54.38 inches of precipitation, nearly 20 inches more than the 30-year annual average of 35.68 inches. This also breaks the previous record 12-month stretch of 53.07 inches, which occurred from May 1968 – April 1969.

From the above data, I hope it is understandable why you have not seen such conditions on the DRSB since the Silver Lake event in 2003.

Also included are a few “Frequently Asked Questions” that I hope will help you better understand how UPPCO operates the DRSB and Hoist Powerhouse.

Regards,

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Definitions:

FERC – Federal Energy Regulatory Commission

DRSB – Dead River Storage Basin

CFS – Cubic Feet of water per Second

SWE – Snow Water Equivalent

2019 Timeline of Events:

January 1, 2019 – 16-20" snow base, 4-6" SWE, DRSB Elevation of 1338.9, Powerhouse flows of 225 cfs

January 15 – 20-30" snow base, 4-6" SWE, DRSB Elevation of 1337.8, Powerhouse flows of 225 cfs

February 1 – 20-30" snow base, 6-8" SWE, DRSB Elevation of 1337.7, Powerhouse flows of 122 cfs

February 15 – 30-40" snow base, 6-10" SWE, DRSB Elevation of 1337.7, Powerhouse flows of 115 cfs

- February 26 – UPPCO requests approval from Agencies to begin drawdown of the DRSB to 1334.0 feet (Agency approval is required as this is outside of the FERC license limit)

March 1 – 40-50" snow base, 12-14" SWE, DRSB Elevation of 1337.6, Powerhouse flows of 140 cfs

- March 4th – UPPCO is granted approval to begin drawdown of the DRSB with a maximum drawdown rate of 0.10 feet (1-1/4") per day
 - Powerhouse flows increased to reduce headwater by approved amount

March 15 – 30-40" snow base, 12-16" SWE, DRSB Elevation of 1336.6, Powerhouse flows of 215 cfs

- Powerhouse flows adjusted throughout month to ensure downstream license compliance (McClure headwater levels) while continuing to reduce the DRSB levels as much as possible
- March 17th weather begins to warm and snow begins to melt increasing inflows to the DRSB

April 1 – 20-30" snow base, 10-12" SWE, DRSB Elevation of 1337.2, Powerhouse flows of 208 cfs

- April 3rd powerhouse flows reach maximum mechanical limits. Inflows above powerhouse releases cause an increase to the headwater levels

April 15 – 20-30" snow base, 8-10" SWE, DRSB Elevation of 1339.1, Powerhouse flows of 350 cfs

- April 24th headwater levels rise above the small spillway crest elevation increasing facility flows
- April 26th headwater levels rise above the large spillway crest elevation further increasing facility flows

May 1 – 2-8" snow base, 2-4" SWE, DRSB Elevation of 1345.5, Powerhouse flows of 350 cfs, spillway flows of 368 cfs

- May 11th inflows peak and begin to drop, causing headwater elevation and facility flows to decrease
- May 14th headwater levels continue to drop and are now below the large spillway crest elevation which continues to reduce facility flows

May 15 – No Snow, DRSB Elevation of 1345.4, Powerhouse flows of 350 cfs, spillway flows of 340 cfs

- May 19th Rain of 4.25” received drastically increased inflows to the Dead River Storage Basin, therefore increasing headwater and facility flows

*SWE and Snow base data obtained from: <https://www.nohrsc.noaa.gov/interactive/html/map.html>

Frequently Asked Questions:

What is the DRSB water level supposed to be?

The DRSB level was set as part of a Federal Energy Regulatory Commission (FERC) licensing process and involved input from various Local, State and Federal agencies to best utilize the water resource. The target levels change throughout the year to best align with the agency comments. Below are the water levels as defined by the FERC:

| Month | Start of Month Target FEET (NGVD) | Minimum Elevation FEET (NGVD) |
|--------------|--|--|
| January | 1339 | 1337.5 |
| February | 1337.5 | 1337 |
| March | 1337.5 | 1337 |
| April | 1337.5 | 1337 |
| May | 1341 | 1339 |
| June | 1341 | 1339 |
| July | 1341 | 1339.5 |
| August | 1341 | 1339.5 |
| September | 1341 | 1339.5 |
| October | 1341 | 1339.5 |
| November | 1341 | 1339.5 |
| December | 1339 | 1338.5 |

What does UPPCO do if water levels are either higher or lower than the target?

If water levels are higher than the target levels, UPPCO looks at current and long-range forecast predictions to best determine how much to increase powerhouse flows to drive down to the target elevation, allowing for an approximate drawdown rate of 0.10 feet/day (as requested by the MDNR). Once the powerhouse flows are maximized there is little else that can be done until the elevation increases to the point where the spillway is engaged. Once the spillway is engaged the amount of flow through the facility is dependent on water level.

If water levels are lower than the targets, UPPCO operates at the license required minimum flow of 100 cfs until the water level reaches the license required minimum elevation, which triggers a Dry Year Consultation process with all DRSB agencies to develop a plan moving forward.

When water is high and spilling over the dam, why does UPPCO adjust flows?

The Hoist spillway is a fixed crest weir, which does not release water until the reservoir reaches an elevation of 1344.60. Therefore, when inflows exceed powerhouse capacity (approx. 350 cfs) the elevation increases until the spillway is engaged. The elevation will continue to increase until water out (spillway + powerhouse) equals water in (flows into the basin from rain/snow/saunas/etc).

The flow over a fixed crest weir is directly related to the reservoir elevation. The higher the elevation over the crest, the higher the flow through the weir. Therefore, as the reservoir elevation decreases there is a corresponding decrease in flow. The flow on UPPCO's website shows a combination of

powerhouse flows and spillway flows and fluctuates based on the flows over the spillway changing with headwater elevation.

The water is very low, and UPPCO is still releasing water. Why?

UPPCO is required to release a minimum of 100 cfs of water through our powerhouse at all times to ensure the health of the river system downstream of the Hoist facility. If UPPCO did not release water through the Hoist facility during times of low water on the DRSB the potential exists for the downstream river to dry up, as water flowing through the facility (natural river location) would be gone.

In periods of dry conditions, UPPCO consults with all agencies to determine the best approach to effectively manage water both in the DRSB and the downstream river.

Rain is in the forecast, why doesn't UPPCO lower the level to help with rainfall?

The Hoist is a very large reservoir and responds very slowly to operational adjustments. The actual volume of control UPPCO has on the outflow from the Hoist does not allow for finer adjustments. Additionally, due to the uncertainty when weather is forecasted, there is no accurate way to determine exactly how much rain will fall over the DRSB area. If UPPCO were to remove water prior to a rain event, and the forecast was wrong, there is no way to recover the water that was released, resulting in low water and reduced fish habitat and recreation function. UPPCO does monitor and record rainfall at our facilities and makes flow adjustments as soon as possible following rain events.

In the past UPPCO always reduced water levels in the winter to prepare for Spring snow melt. Why hasn't this been done the last few years?

UPPCO closely monitors the amount of snow and the amount of water contained in the snow to best prepare the DRSB for spring conditions. Over the last few years, the amount of snow on the ground in early winter has been minimal. The resource agencies have also been reluctant to allow a drawdown condition without supporting documentation showing water on the ground to ensure the DRBS will fill during the spring melt. Since 2015, a majority of the snow around the DRSB has been received after February 15th, limiting the ability to draw enough water out of the DRSB prior to the spring melt. The resource agencies have also been setting limits on the drawdown rate.

UPPCO mentions having to Consult with Agencies to make any major changes. Who are they talking to, and why?

All FERC approved licenses have resource agencies or stakeholders that have a vested interest in the outcomes of how a storage basin is operated. For any operations changes outside of the license parameters, a unanimous approval must be obtained by UPPCO from the Michigan Department of Natural Resources; Michigan Department of Environment, Great Lakes, and Energy (former DEQ); United States Fish and Wildlife Service; Dead River Campers Inc. and the Keweenaw Bay Indian Community. Agencies were involved with the development of the license parameters to ensure protection for their respective groups (wildlife, water quality, recreation, etc) and changes to license parameters need to be vetted to ensure protection is continued during times of proposed operations changes. This process may take a few hours or few weeks depending on the requested change.