

**2012 Lake Hopatcong
Water Level Management Report**

LHC Citizen Advisory Committee

New Jersey Department of Environmental Protection

Executive Summary

The winter of 2011 and Spring of 2012 were among the driest experienced around Lake Hopatcong in many years. In fact, several Lake Hopatcong residents and members of the Citizen Advisory Committee (CAC) reported at the annual meeting of the CAC that this was the first time they have experienced no ice on the lake during the winter. With predicted changing weather patterns from cold and wet to warmer and drier, several members of the CAC raised the question as to whether or not the state should suspend an annual 26 inch drawdown or adjust the level that is drawn down annually or continue as we have. In addition, questions as to the risk of refill were also raised as it relates to the upcoming five foot drawdown. While the group acknowledged the advantages to a five foot drawdown—dock and bulk head repairs, weed growth containment, dredging and lake bottom debris cleanup, State Fisheries program indicated that there is no environmental benefit to a five foot or annual drawdown.

After much debate, it was determined that we would proceed with the annual and five foot drawdown. However, a survey of lakefront property owners was recommended to determine the cost/risk benefit of annual drawdown versus the risk of the lake not refilling. This survey will be conducted in early 2013. A meeting of the CAC to discuss results will take place once results are summarized.

Recommendations of the CAC based on Events/Experiences in 2012

1. In the event of dry winters and spring it is advised to begin refilling the lake as early as possible. The state began the refill process in mid- February. It is possible that if there is not a hard freeze by January, it is highly unlikely one will occur. Therefore, consideration should be given to start refill in January.
2. Conduct a lake front property owner's survey to learn cost of dock and bulkhead repairs annually and as a result of ice damage.
3. Despite requests for adjustments to reduce outflow from the lake during predicted rain events, it was determined that very little recovery of water in the lake resulted. Therefore, it is not advisable to adjust outflow based on rain predictions as they are highly variable and not reliable.

Introduction

In accordance with the Lake Hopatcong Water Level Management Plan, the lake was lowered 26” in the fall of 2011 to protect docks and bulkheads from ice damage. As a result of the mild winter resulting in the lack of significant ice coverage on the lake and a long term weather forecast of warmer and drier weather, the 23 cfs outflow of the lake was reduced early to the required minimum flow of 12 cfs on February 18th to commence refilling.

Unfortunately, the months of January, February and March were dry yielding only 5.82” of rain. As of March 3, the lake level was at 7.05 feet. The middle of March showed only marginal gain at 7.15 feet, only to drop down to 7.08 feet by March 31. Therefore staff from the Division of Fish and Wildlife and Parks and Forestry used the options outlined in the water level management plan to determine if adjustment to outflow of the lake could be safely made without detriment to the fishery in the Musconetcong River.

Division of Fish and Wildlife-Bureau of Freshwater Fisheries

As a result of the slow refill of the lake, the Division’s Bureau of Freshwater Fisheries staff began monitoring weather patterns in mid-March to determine if a reduction of the required minimum passing flow of 12 cfs could be made to the outflow of the lake to aid the refill process. In accordance with the Lake Hopatcong Water Level Management Plan, a reduction to the outflow can be considered if 90 day precipitation levels fall below 7.0”.

APRIL

- On April 9, 2012 stream temperatures taken at several locations in the Musconetcong River ranged from 9.4° – 10.8° C which are well below the temperature criterion for trout maintenance waters. Low river flows continued throughout the state and air temperatures increased, day as well as night time temperatures, with an untimely warming trend in early April. Existing flow conditions in the river between Lake Hopatcong and Lake Musconetcong were considered adequate to support the fisheries. As a result of the prevailing cool stream temperatures and continued lack of precipitation the outflow of the lake was reduced on April 12 from 12 cfs to 8.2 cfs, the lake level was at 7.10 ft.
- Stream temperatures on April 19 had increased to 15.9 ° C.
- As of April 21 the lake continued to drop, 7.01 ft, despite the nine days of reduced outflow.
- On April 23 the outflow was further reduced to 6.8 cfs for a 24 hour period to maximize capture of a significant rain that fell the day before.

- The rain which fell in the later part of April resulted in some recovery of the lake with lake level reaching 7.46 by month's end.

MAY

- Lake level on May 1 was 7.5 ft.
- On April 15 the outflow was once again reduced to 6.8 cfs for a 24 hour period to capitalize on a forecast of heavy rains anticipated for the next day or two. Although the area received 0.4 inches of rain on April 16 it was 1.5 inches less than forecasted.
- Stream temperatures continue to increase from 16.6° C (May 8) to 20.9° C (May 17), just downstream of the dam. As a result, the outflow of the lake was restored to 12 cfs on May 17.
- Lake level on May 19 was 8 ft.
- Outflow of the lake was reduced for a final time to 8.2 cfs for a 24 hour period on May 21.
- Rain fell steadily for the week of May 21 greatly helping the lake level.
- Lake level on May 31 was 8.6 ft.

JUNE

- Lake reached full pool on June 2 – 9.0 ft.

JULY

- Stream temperatures taken on July 6 measured 28.1 °C just below the Lake Hopatcong dam, and reached their maximum of 29.8 °C 50 m downstream of Rt. 183 bridge, located below Lake Musconetcong.

Division of Parks and Forestry

Due to extremely dry weather patterns during the winter of 2011-2012 and little or no precipitation during the Spring of 2012, Lake Hopatcong took several months to reach full pool. There were eight days where special temporary adjustments were made to the gate in an attempt to aid in the refill of the lake. These adjustments occurred on April 12 (8.2 CFS), 23 (6.8 CFS) and 24 (8.2 CFS) and on May 15 (6.8 CFS), 16 (8.2 CFS), 18 (12 CFS), 21 (8.3 CFS) and 22 (12 CFS).

The following is a summary of outflows and lake levels:

- Drawdown began on November 10, 2011
- Reached 26 inch mark on December 19, 2011

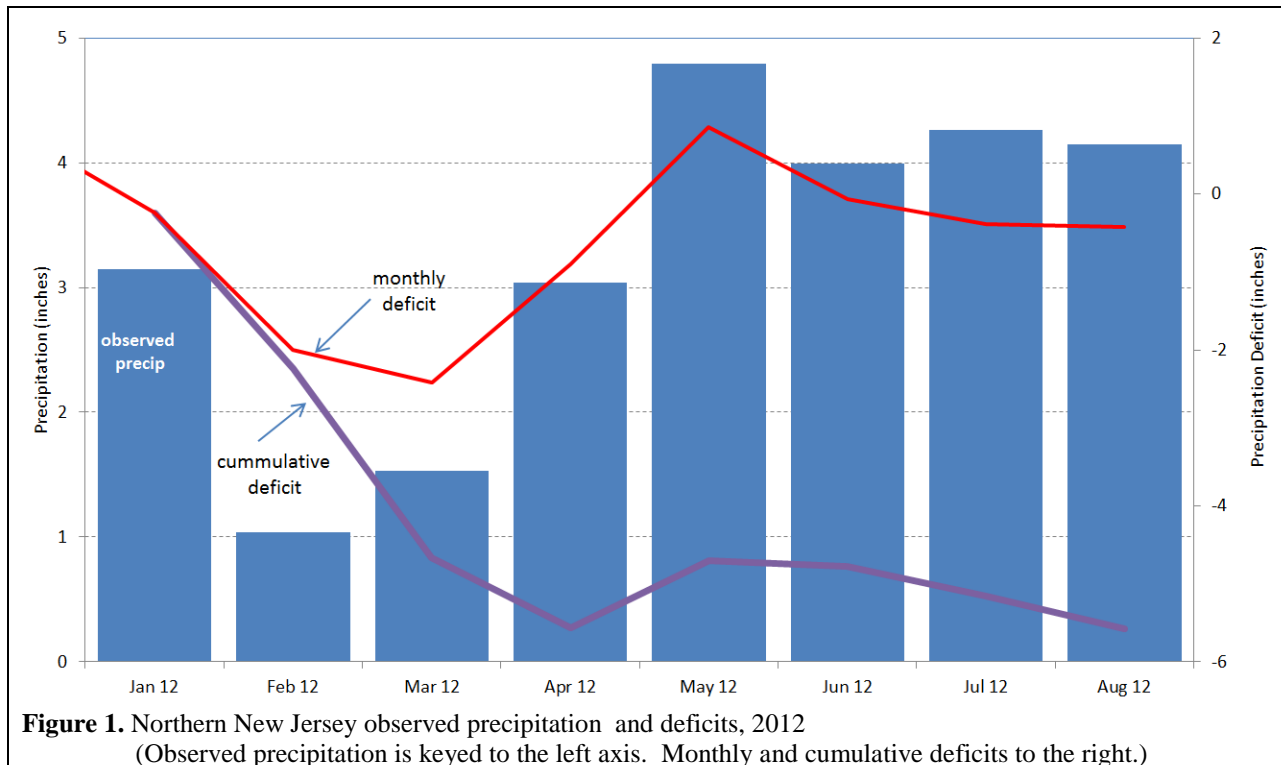
- Began to refill lake early on February 18, 2012
- Lake reached 9 foot by June 5, 2012

New Jersey Geologic Survey Effect of Passing Flow Relaxations – 2012

In spring 2012 the level of Lake Hopatcong did not recover as it normally does in the spring. This was due to a very dry spring in northern New Jersey (table 1, figure 1). Observed precipitation was below normal in January through April. May was wetter than normal, but June through August was again drier than normal. (These precipitation data are from the web site of the NJ State Climatologist.)

Table 1. Northern New Jersey observed precipitation and deficits, 2012

month	Precipitation (inches)		Deficit (inches)	
	observed	average	monthly	cumulative
January	3.15	3.39	-0.24	-0.24
February	1.04	3.04	-2.00	-2.25
March	1.53	3.95	-2.42	-4.66
April	3.04	3.94	-0.90	-5.56
May	4.79	3.94	0.85	-4.71
June	3.99	4.06	-0.07	-4.77
July	4.26	4.65	-0.39	-5.16
August	4.15	4.57	-0.42	-5.58



Due to the lower-than-normal rainfalls the water level in Lake Hopatcong did not recover as it normally does in the spring (fig. 2). Levels stayed around the 7 feet mark into early May, the first month in 2012 with above average precipitation.

In effort to increase lake levels NJDEP personnel relaxed the 12 cfs passing flow in order to keep more water in the lake. On many days in April and May the passing flow was reduced to approximately 8 cfs. This was done on days when the decrease in flows would not affect downstream water temperatures. This evaluation required continual monitoring of lake levels, river flows, anticipated precipitation, actual precipitation, and temperature. This effort was significant.

A reconstruction of flows and lake levels shows that the relaxation of passing flows in April and May, thus keeping water in the lake, created a 1 inch rise in lake level (fig. 2).

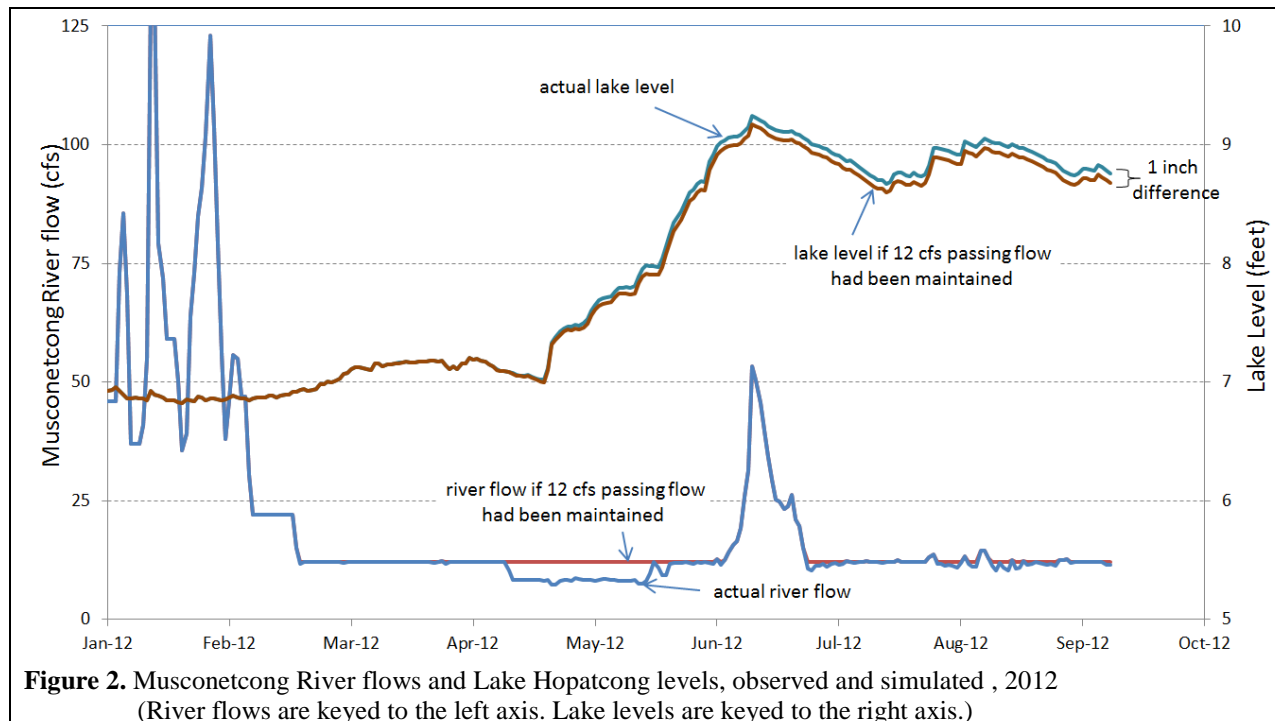


Figure 2. Musconetcong River flows and Lake Hopatcong levels, observed and simulated , 2012
(River flows are keyed to the left axis. Lake levels are keyed to the right axis.)

This reconstruction was done as follows:

- (1) Create a time series of observed stream flows. These data are from the USGS stream gage on the Musconetcong River at the outlet of Lake Hopatcong.
- (2) For every day on which average daily flow was less than 12 cfs, calculate the difference. This represents the amount of water which would have had to have been released to meet the passing flow but was instead held back in the lake.
- (3) Create a time series of observed lake levels. These data are from the USGS web site that reports water level in Lake Hopatcong.
- (4) On every day on which the passing flow was relaxed, subtract the volume of water held back from the lake level. This approximates what the lake level would have been if additional water had been released to meet the 12 cfs passing flow.

The passing flow was relaxed on numerous days in April and May 2012. The net effect was that there was a growing divergence between the observed lake levels and what the lake level would have been if additional water had been released each of those days to meet the 12 cfs passing flow. By the end of May the observed and simulated lake levels diverged by 0.083 feet, which is 1.0 inches.

In summary, the relaxation of the 12 cfs passing flows from Lake Hopatcong in April and May 2012 resulted in a net increase in lake level of 1 inch.

Conclusion

Rainfall throughout the spring was highly variable and very localized thus making temporary reductions to lake outflow largely ineffective. The three times the outflow of the lake was reduced for a 24 hour period in an attempt to capture rain from a predicted heavy rainfall, the resulting precipitation was always less than forecasted. Analysis by NJGS demonstrated that only 1 inch in lake level was gained through the reductions in outflow of the lake that took place from April to May.

Despite great attention to managing the dam and multiple adjustments to outflow of water from the lake, the only action that filled the lake was precipitation.

Appendix 1
Knee Deep Club Letter

October 3, 2012

To: The Citizens Advisory Committee (CAC) for the Lake Level Management Plan

From: Knee Deep Club

Subject: Negative Impact if the Annual Lake Drawdown's are Eliminated

Introduction:

The following comments and positions have been discussed and approved by the Board of the Knee Deep Club. The Knee Deep Club is a 66 year old 501(c)(3) non-profit fishing and environmental club located at Lake Hopatcong with over 770 active members. The club represents a diverse group of Lake Hopatcong stake holders that come from all demographics and regions. On the Board we have members from Bergen, Passaic, Morris and Sussex counties. Most of the Board reside in Morris & Sussex Counties, the four bordering towns and include two lake front home owners. The Board is as diverse as our general membership. Currently we share over 200 years of experience serving on the Knee Deep Club Board and we have vast local knowledge. We hope that our comments will be given full consideration.

Negative Impacts if Annual Lake Drawdown's are Eliminated:

- 1. Environmental:** It is universally accepted science that drawdowns help with control of nuisance level weed growth.
 - a. The exposed lake bed during a typical winter experience a deep penetrating frost that kills off all weeds.
 - b. The shallow areas of the lake where weed growth occurs are usually covered with ice and snow that restricts sunlight and impedes winter growth of cold water aquatics like curly pond weed.
 - c. The lowering causes the weed canopy to drop simply by the lowering of the water level. Aquatic weeds cannot exist where there is no water.
 - d. In winters when we have a foot or more of ice, when the lake returns to full pool, the top 3 foot of the water column (5 feet on the five year draw down) will be virtually weed free until the growing season begins. This reduces the costs of mechanical harvesting and early season recreational boating is not impeded by nuisance levels of weed until later in June.
 - e. What about the impact downstream? The lake absorbs 1.8 billion gallons each year to fill up and softens the blow to downstream users. What will happen when our lake is spilling 2-3 feet over the dam? The gates cannot be opened to relieve us if people downstream are being flooded. Many property owners, both at Lake Hopatcong and downstream, have been saved from severe flooding because Lake Hopatcong absorbs the first 1.8 billion gallons before water begins to flow over the dam. Did anyone even think of these obvious potential hazards?

- f. **Has an Environmental Impact Study been conducted?** That would seem like a mandatory requirement, for both Lake Hopatcong and the Musconetcong watershed, before something of this scale would be considered.

2. Fishery: The Knee Deep Club has vast local knowledge of the fishery and the effect of high water.

- a. Every year we lose substantial numbers of valuable game fish when the lake reaches 9.5' (the high water—no wake level). We have worked with the Div. of Fish & Wildlife to electro shock and try to capture fish that are trapped in the river and relocate them back in lake Hopatcong. We can expect to experience record early spring lake levels up to 3' above the spillway based on climatic history on a fairly regular basis.
- b. Trout fishing is the number one early season lake activity. The early Trout fishing is essential in the early spring for businesses around the lake. If the lake is left at full pool during the winter and the weeds grow to the top (as explained above) trolling in shallow areas, which is the number one technique used to target spring trout, will be nearly impossible.
- c. Several fish species, including Pickerel, Yellow Perch, White Perch and Walleye, all spawn early in the season when the lake is at least 26" down. At full pool all of those known spawning sites will no longer exist or be dramatically changed and fish spawning and reproduction will be negatively impacted.

3. Property Safety:

- a. Property safety is a vital issue. We at the Knee Deep Club find it difficult to understand how anyone could even think of proposing the elimination of a lake level management plan that, while it was recently fine tuned, has been in effect for over 80 years.
- b. We never could have anticipated the extreme early dry weather we experienced this past winter because it has never happened since accurate weather data has been collected going back to the late 19th century. Could it happen again? Yes. But will it? Not very likely. But even with those extreme conditions we fully recovered by the first week of June.
- c. **2011:** Let's consider what happens when we have normal weather patterns. From March 6th to the 13th, the lake rose the full 26" and was spilling over the dam within one week. During that time a boat house in the River Styx area along with a 100 year old pier were destroyed by the floating fields of ice. What would have happened if the ice covered lake were at full pool when the roughly 2 billion gallons of water flowed into the lake in a one week period. How much more damage could be done if the huge ice field was 2' above the normal lake level?
- d. **2010:** In just 48 hours from March 13th to the 15th, the lake rose from 15" below the dam to 9' 9" which is well above the high water (no wake) level.
- e. **2008:** The Lake rose from nearly one foot below the top of the dam to the 9.5' high water level in five days.

- f. **What would have happened:** What would have happened if in each of those years, early spring rains and melted snow pack had occurred when we were at full pool. Consider that we were still ice fishing during those periods in both 2010 and 2008. Imagine what will happen if the lake is 2-3 above the spillway with massive fields of ice 12" thick being blown around by heavy winds? This proposal could cause millions of dollars of damage to lake front properties. What about homes that are built on foundations that lay in the water table, that have never been frozen and heaved because the lake has always been lowered during the winter. What will happen to those homes if the lake is maintained at full pool? Standard SOP for construction requires 36" depth for footings to avoid frost heaving but if we suddenly raise the water table by 26" these foundations will be at risk of serious damage. How many septic systems are in low lying areas that will be compromised by unnecessary flooding because there was no drawdown? How many hundreds of privately owned expensive electric boat lifts that were all installed based on the known winter lake levels would be ruined by heaving ice?

4. Impact on Boating:

- a. Even with the most extreme winter drought, no snow fall resulting in no snow pack to contribute to filling the lake and with an unusually dry early spring, the lake was still spilling over the dam by June 4th. Absolutely no boating activity was impacted in 2012.
- b. This spring, the Knee Deep Club was able to mobilize enough boats to float stock our pre-season Trout. We also assisted Fish & Wildlife to float stock all of their in season Trout. Both our Pickerel Contest in April and our Trout Contest in May were well attended because everyone was able to launch their boats.
- c. Larger boats were all able to be launched before the end of May. As we know, the recreational boating season does not really get under way until late in June.

5. Final Point:

We at the Knee Deep Club do not understand why the elimination of the draw downs is even being discussed. Last year, the driest winter in recorded history did not impact the lake levels or recreational boating. We think the problem might be that the CAC is too heavy with state representatives that don't have any local knowledge, marina business owners who have commercial interests and that the downstream members simply don't understand or necessarily have great interest about impacts to Lake Hopatcong. This proposal appears to be a knee jerk reaction to an event that never really occurred. This past spring was an outlier year climactically, but even with that extreme weather pattern no serious negative impact occurred.

6. ACTION:

We urge that you immediately abandon this unwarranted change to the lake level management plan.

Respectfully submitted by the Knee Deep Club Board

CC: Lake Hopatcong Commission
Division of Fish & Wildlife, Fisheries Bureau Chief Lisa Barno