

**New York State Department of Environmental Conservation/New York City Department
of Environmental Protection (DEC/DEP) Interim Ashokan Release Protocol
October 18, 2011**

Introduction: DEC and DEP are seeking to implement an Interim Ashokan Reservoir Release Protocol (Protocol) to enhance benefits to the community, improve flood attenuation, and provide better water quality. DEC and DEP have agreed to implement the following Interim Protocol on an interim basis and recognize that it may be modified or terminated as additional modeling and impact assessments are performed and as additional information becomes available. DEP is agreeing to implement the Protocol on a voluntary basis to improve the operation of the Ashokan Reservoir and benefit the community nearby the Reservoir as well as consumers of New York City drinking water.

Such Protocol is interim as it may be revised as a result of lessons learned during its implementation, further discussions are concluded between DEP and DEC, or through a modification to SPDES permit #3-9903-00023/00006: SPDES No.: NY-0264652 issued by the DEC after an appropriate public process.

1. Community Release Protocol:

- a. Purpose:** to provide environmental, recreational and economic benefits to the lower Esopus Creek in a manner that will not adversely impact water supply.
- b. Minimum Flow:** DEP will make releases from the Ashokan Reservoir through the releases channel at the rates prescribed in the following table.

Reservoir Storage Condition¹	Summer (May 1 – Oct 31)	Winter (Nov 1 – Apr 30)
Normal Hydrologic Condition	15 MGD	10 MGD
Drought Warning Condition	10 MGD	4 MGD
Drought Condition	0	0

Note 1: Reservoir Storage Condition is based on the storage in the Cannonsville, Pepacton and Neversink Reservoirs.

- c. Turbidity:** When substantial contrast in turbidity exists with varying depths in the West Basin of the Ashokan Reservoir, DEP will make reasonable efforts to make releases from the elevation with the least turbidity.

2. Discharge Mitigation Release Protocol:

a. Purpose: In order to enhance flood mitigation provided by the Ashokan Reservoir, DEP will utilize the established Conditional Seasonal Storage Objective (CSSO) rule curve depicted in Figure 1. Consistent with good practices for water supply reservoirs, and in order to ensure that sufficient resources are available during an extended dry period to support water supply needs, it is essential to ensure that the Ashokan Reservoir is filled on or around June 1st every year. To accomplish this, the CSSO must be limited and ramped. For the duration of the Interim Protocol DEP shall endeavor, to the maximum extent possible without impacting water supply reliability, to maintain reservoir levels at the CSSO, thus creating a high probability of maintaining a ten (10) percent void space from October 14 through March 15 to help mitigate flooding events. In determining the releases needed to maintain the CSSO, the following parameters are considered in the evaluation: forecasted inflows over the next seven (7) days, anticipated diversions over the next seven (7) days, a percentage as appropriate of the snow water equivalent in the watershed, and the current usable reservoir storage. Based on any projected seven (7) day storage surplus, release volumes are calculated and spread over the upcoming seven 7-day period, within the limitations of the release works for the Ashokan Release Channel. Discharge Mitigation releases are designed to help mitigate the effects of flooding immediately below the Ashokan Reservoir to the lower Esopus Creek communities.

b. Maximum Flow: Throttle as necessary so the combined flow for Ashokan spill and Release Channel discharge does not exceed 1,000 MGD. In addition, shutdown when the USGS gage on the Esopus Creek at Mount Marion (Lower Esopus) is within 1 foot of the "Action Stage" (18') and is forecasted to reach "Action Stage", as predicted on the NWS's Advanced Hydrologic Prediction Service web page. DEP shall endeavor to achieve the CSSO in a manner that minimizes the need for maximum flow, large volume releases.

Because the lower Esopus Creek is used for various recreational and agricultural purposes, it may be necessary, at times, to limit the flow rate from July 1 to October 14 to be protective of those uses. Therefore, the maximum flow rates may be limited during this time frame as deemed necessary by DEC or in response to a request by a downstream municipality, if approved by DEC.

c. Dates: July 1 through May 1

d. Turbidity: When substantial contrast in turbidity exists with varying depths in the West Basin of the Ashokan Reservoir, DEP will make reasonable efforts to make releases from the elevation with the least turbidity. Given the significant operational

effort required to make intake level changes, the frequency of intake changes shall be limited to no more than every 2 weeks. Releases lasting longer than 14 days with turbidity levels higher than an average of 300 NTU shall be followed by a 72 hour flush of the least turbid water available in the Reservoir upon meeting the storage objective.

e. Ramping Rates: All changes in water release rates will be conducted in accordance with the following schedule:

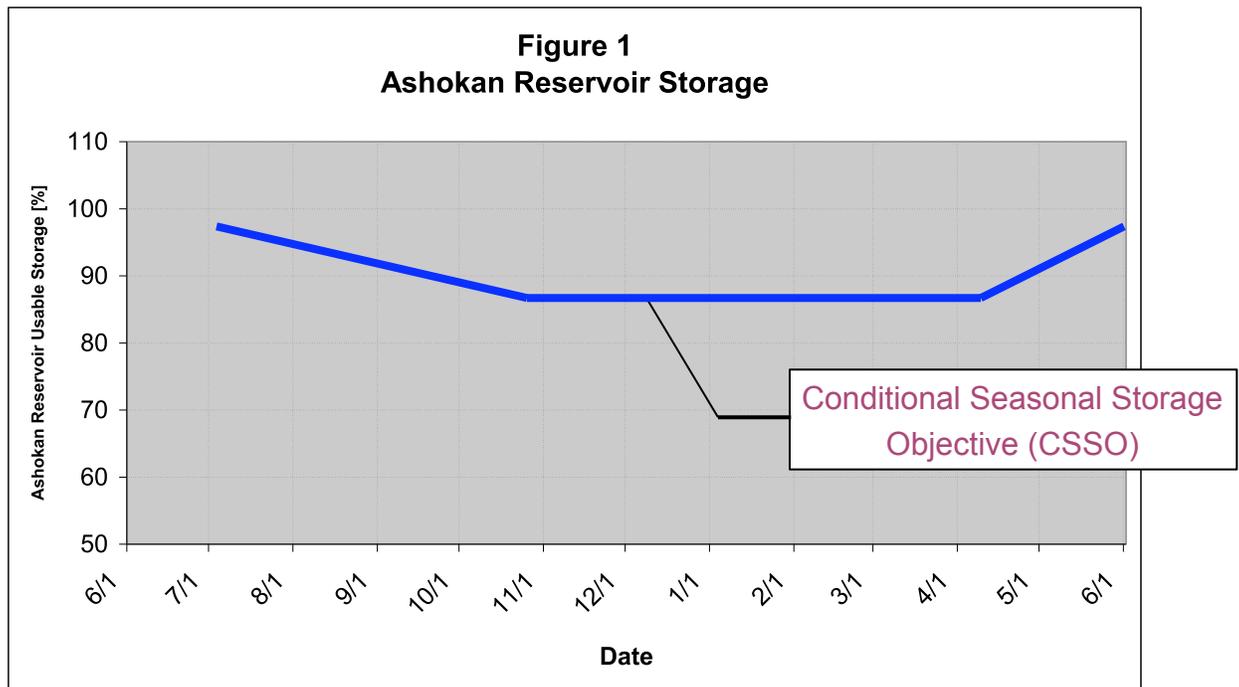
i. Flow Increases:

1. For flows greater than 0 and up to 80 MGD: 20 MGD/hr
2. For flows greater than 80 MGD and up to 200 MGD: 40 MGD/hr
3. For flows greater than 200 MGD: 40 MGD/half-hour

ii. Flow Decreases:

1. For flows greater than 200 MGD: 40 MGD/half-hour
2. For flows from 200 to 80 MGD: 40 MGD/hr
3. For flows from 80 to 0 MGD: 20 MGD/hr

f. Void Target: Conditional Seasonal Storage Objective (CSSO) as per Figure 1



Note: The CSSO is in effect from July 1st through May 1st

3. Operational Release Protocol:

- a. **Purpose:** to prevent or mitigate the spilling of more turbid west basin waters into the east basin of the Ashokan Reservoir in order to protect water quality and enhance the flood mitigation benefit that the reservoir already provides to the lower Esopus Creek communities.

- b. **Maximum Flow:** Throttle as necessary so the combined flow for Ashokan spill and Release Channel discharge does not exceed 1,000 MGD. In addition, shutdown when the USGS gage on the Esopus Creek at Mount Marion (Lower Esopus) is within 1 foot of the "Action Stage" (18') and is forecasted to reach "Action Stage", as predicted on the NWS's Advanced Hydrologic Prediction Service web page. Because the Lower Esopus Creek is used for various recreational and agricultural purposes, it may be necessary, at times, to limit the flow rate to be protective of those uses. Therefore, for the period from May 1 through October 30, the maximum flow rate through the release channel for operational releases shall be limited to no more than 300 MGD unless a larger release rate is necessary to prevent overspill of poor quality water from the West Basin into the East Basin of the Ashokan Reservoir.

- c. **Void Target:** to be determined based on current and predicted hydrologic conditions to protect water quality and ensure reservoir refill.

- d. **Ramping Rates:** All changes in water release rates will be conducted in accordance with the following schedule:
 - i. **Flow Increases:**
 1. For flows greater than 0 and up to 80 MGD: 20 MGD/hour
 2. For flows greater than 80 MGD and up to 200 MGD: 40 MGD/hour
 3. For flows greater than 200 MGD: 40 MGD/half-hour

 - ii. **Flow Decreases:**
 1. For flows greater than 200 MGD: 40 MGD/half-hour
 2. For flows from 200 to 80 MGD: 40 MGD/hour
 3. For flows from 80 to 0 MGD: 20 MGD/hour

- e. **Turbidity:**
 - i. **November 1 through April 30:**

Turbidity	Duration	Comments
0-30 NTU	Unlimited	
30-60 NTU	21 Days	At the end of the 21 day discharge provide a 1.5 billion gallon release of lower turbidity water of 30 NTU or less (or best quality available water) prior to resuming additional turbid water discharges
60-100 NTU	14 Days	At the end of the 14 day discharge provide a 1.5 billion gallon release of lower turbidity water of 30 NTU or less (or best quality available water) prior to resuming additional turbid water discharges
>100 NTU	(see Note 1)	

Note 1: The discharge of water with turbidity >100 NTU shall be allowed only on those days where the Esopus Creek, flowing in to the Ashokan Reservoir, has turbidity >100 NTU. If releases are being made and the turbidity of the Esopus Creek flowing into the Ashokan reservoir drops below 100 NTU, DEP shall commence ramping down the releases rate on the next day and shall cease the release no more than 3 days after the turbidity in the creek fell below such threshold. DEP shall conduct daily turbidity monitoring for the period during which such releases are being made.

ii. May 1 through October 31:

Turbidity	Duration	Comments
0-30 NTU	Unlimited	
>30 NTU	(See Note 1)	

Note 1: The discharge of water with turbidity >30 NTU shall be allowed only on those days where the Esopus Creek, flowing in to the Ashokan Reservoir, has turbidity >30NTU. If releases are being made and the turbidity of the Esopus Creek flowing into the Ashokan Reservoir drops below 30 NTU, DEP shall commence ramping down the releases rate on the next day and shall cease the release no more than 3 days after the turbidity in the creek fell below such threshold. DEP shall conduct daily turbidity monitoring for the period during which such releases are being made.

4. Notification:

- a. Report all operational changes of the release channel to the Ulster County Emergency Management office, Ulster County Department of the Environment, and DEC.
- b. Continue to send operational data to Ulster County and Town officials on a daily basis and provide turbidity data to Ulster County upon written request.
- c. Report all water quality data to DEC promptly after receipt.

5. Monitoring:

a. Water Flow:

- i.** Monitor continuously by the DEP Water Supply Control Center via the Supervisory Control and Data Acquisition System with telemetry from release channel gages.
- ii.** During periods of inoperable continuous monitoring - perform visual gage readings at least once daily and as flow is changed.

6. Water Quality:

Please see attached “Water Quality Monitoring Plan, Ashokan Watershed - Release Channel Operations”

7. Exceptions:

DEP may operate at variance with this Interim Protocol if any of the following conditions are met:

- a.** DEP, with concurrence by DEC, determines that additional resources are reasonably necessary for reservoir balancing, for refill of the Ashokan Reservoir, for proper water supply management, or in the case of drought watch, warnings or emergencies.
- b.** DEP takes an emergency action.
- c.** DEP, with concurrence by DEC, determines that releases must be changed or interrupted as necessary for inspection, maintenance, testing and repairs.
- d.** DEP, with concurrence by DEC, responds to a spill mitigation request (release or request not to release) from Ulster County or other downstream municipality provided the request will not adversely impact water supply.

8. Utilization of the Shandaken Tunnel:

- a. During Discharge Mitigation Releases, the use of the Shandaken Tunnel to provide water to the Ashokan Reservoir will be minimized in keeping with the existing SPDES Permit and consistent with proper water supply management.