Introduction

This Low Inflow Protocol (LIP) provides trigger points and procedures for how the Nantahala Project will be operated by the Licensee during periods of low inflow (i.e. periods when there is not enough water flowing into Nantahala Lake to meet the normal needs for power generation, recreation flows, minimum flows, any on-reservoir water withdrawals and lake level maintenance). The protocol was developed on the basis that all parties with interests in water quantity will share the impact of low inflow.

In general during periods of normal inflow, the Licensee will provide at least a prescribed number of hours per day of generation to support electric customer needs and the needs of whitewater boaters in the main stem of the Nantahala River, in addition to providing minimum flows in bypass channels, scheduled Tainter gate releases for recreation and maintaining lake levels above certain prescribed minimum levels. During low inflow periods when the Licensee cannot meet all of the above conditions, it will reduce generation by one hour per day on a weekly basis, along with corresponding weekly reductions in bypass flows, Tainter gate releases for recreation and minimum reservoir levels. In addition, any large (i.e. greater than or equal to 1 Million Gallons per Day (MGD) maximum instantaneous capacity) water intakes that are authorized on Nantahala Lake, Whiteoak Pond or Dicks Pond in the future will also have a reduction protocol incorporated into the easement documents that the Licensee uses to approve of such intakes. The incremental reduction of all water demands on the system will continue until inflows are restored to a point where Nantahala Lake level returns to its Normal Operating Range.

Key Facts and Assumptions

1. Dicks Creek – Dicks Creek will continue to be free-flowing with inflow into the pond formed by Dicks Diversion Dam being equal to the outflow at the base of the dam. No water will be diverted into the penstock at Dicks Diversion Dam.

2. Minimum Flows in Bypass Channels – Assume the new license for this project will include the following requirements for minimum releases from hydro project works into bypass channels to enhance water quality and/or aquatic species habitat (except during periods of low inflow covered by a low inflow protocol):

    a. Nantahala River Bypass
        1) Minimum Flow Valve #1 - Maintain the existing minimum flow valve capable of releasing up to 8 cfs from the Whiteoak Penstock into Dicks Creek to provide flows in the Nantahala River Bypass.

2) Minimum Flow Valve #2 - Install an additional minimum flow valve capable of releasing up to 8 cfs from the Whiteoak Penstock into Dicks Creek to provide flows in the Nantahala River Bypass.

3) From the 2 minimum flow valves located on the Whiteoak Penstock, provide a total of the following releases into Dicks Creek to provide flows in the Nantahala River Bypass:

a) From November 1 through May 31, 8 cfs.
b) From June 1 through October 31, 16 cfs.

b. Whiteoak Creek Bypass

1) Whiteoak Diversion Dam - Provide 8 cfs or stream flow, whichever is less, from the Whiteoak Diversion Dam into the Whiteoak Creek Bypass from January 1 through December 31.

3. Normal Generation Releases for Recreation – Assume the new license for this project will include the following requirements for a Normal Generation Schedule to Support Recreation at the Nantahala Powerhouse, with all releases being at or above the Best Efficiency Flow for the Nantahala Hydro Unit:

a. 2nd Monday in March through March 31 – 10:00 am to 3:00 pm, seven days per week

b. April – 10:00 am to 4:00 pm, seven days per week

c. May through Labor Day – 9:00 am to 5:00 pm, seven days per week, plus provide one additional hour to the schedule (i.e. 9:00 am to 6:00 pm) on both the Saturday and Sunday before Memorial Day and Labor Day

d. September after Labor Day – 10:00 am to 4:00 pm Sunday through Friday, 9:00 am to 5:00 pm Saturday

e. October – 10:00 am to 3:00 pm Sunday through Friday and 9:00 am to 5:00 pm Saturday.

4. Other Prescribed Generation Releases – Assume the new license for this project will also include the following requirements for prescribed generation releases in addition to the above Normal Generation Schedule to Support Recreation:

a. Whitewater Races - Provide up to 70 hrs per year of generation releases (all at or above the Best Efficiency Flow for the Nantahala Hydro Unit) to support established National, Southeastern Regional or State Level Whitewater Races. To the maximum practical extent, releases will be integrated with the normal release schedule so that additional release hours beyond the normal release schedule are not needed.

b. Other Special Events – Other non-race requests for special generation releases that require additional generation hours above the total number of hours in any given month in the Normal Generation Schedule to Support Recreation will be handled on a case-by-case basis. To the maximum practical extent, releases will be integrated with the normal release schedule so that additional release hours beyond the normal release schedule are not needed.

5. Bypass Flow Releases for Recreation – Assume the new license for this project will include requirements for scheduled releases from Nantahala Dam into the bypass channel to enhance downstream recreation:

a. Spring Weekend - Release water for six hours per day for one weekend (Saturday and Sunday) per year, scheduled for the last weekend in April. Target flowrates will be approximately 250 cfs on Saturday and approximately 350 cfs on Sunday. Releases will be timed to reach the confluence of Whiteoak Creek with the Nantahala River (i.e. approximately 5.8 river miles downstream of Nantahala Dam) at approximately 10:00 am.

b. Summer Afternoons - Provide four total afternoon releases per year for 3 hrs each at a target flowrate of approximately 250 cfs, scheduled between June 15 and August 31. Releases will be timed to reach the confluence of Whiteoak Creek with the Nantahala River (i.e. approximately 5.8 river miles downstream of Nantahala Dam) at approximately 4:00 pm.

c. Fall Weekend - Release water for seven hours per day for one weekend per year, scheduled between September 15 and September 30. Releases will be for seven hours at a target flowrate of approximately 300 cfs on Saturday; and five hours at a target flowrate of approximately 425 cfs and two hours at a target flowrate of approximately 250 cfs on Sunday. Releases will be timed to reach the confluence of Whiteoak Creek with the Nantahala River (i.e. approximately 5.8 river miles downstream of Nantahala Dam) at approximately 10:00 am.

d. Target Flowrates - The target flowrates stated above are for flowrates immediately below the confluence of Whiteoak Creek with the Nantahala River (i.e. approximately 5.8 river miles downstream of Nantahala Dam). Actual release amounts from the Tainter gates need to be large enough that when combined with other tributary and accretion flows, the total is at or above the approximate target flowrates.

6. Normal Full Pond Elevation – also referred to simply as "full pond", this is the level of a reservoir that corresponds to the point at which water would first begin to spill from the reservoir's dam(s) if the Licensee took no action. This level corresponds to the lowest point along the top of the spillway (including any fuse plugs or flashboards) for reservoirs without flood gates and to the lowest point along the top of the flood gates for reservoirs that have them. For Nantahala Lake, Normal Full Pond Elevation is at 3012.2 ft above Mean Sea Level. To avoid confusion among the many reservoirs the Licensee operates, it has adopted the practice of referring to the Normal Full Pond Elevation for all of its reservoirs as equal to 100.0 ft relative.

7. Normal Minimum Elevation – the level of a reservoir (measured in ft above Mean Sea Level (msl) or feet relative to the full pond contour with 100.0 ft corresponding to full pond) that defines the bottom of the reservoir's Normal Operating Range for a given day of the year. If inflows and outflows to the reservoir are kept within some reasonable tolerance of the average or expected amounts, hydro project equipment is operating properly and no protocols for abnormal conditions have been implemented, reservoir level excursions below the Normal Minimum Elevation should not occur.

8. Normal Maximum Elevation – the level of a reservoir (measured in ft above Mean Sea Level (msl) or feet relative to the full pond contour with 100.0 ft corresponding to full pond) that defines the top of the reservoir's Normal Operating Range for a given day of the year. If inflows and outflows to the reservoir are kept within some reasonable tolerance of the average or expected amounts, hydro project equipment is operating properly and no protocols for abnormal conditions have been implemented, reservoir level excursions above the Normal Maximum Elevation should not occur. (Note: See Item 17 below for special drought storage considerations).

9. Normal Target Elevation - the level of a reservoir (measured in ft above Mean Sea Level (msl) or feet relative to the full pond contour with 100.0 ft corresponding to full pond) that the Licensee will endeavor in good faith to achieve, unless operating in the Low Inflow or Hydro Project Maintenance & Emergency Protocol. Since inflows vary significantly and outflow demands also vary, the Licensee will not always be able to maintain actual lake level at the Normal Target Elevation. The Normal Target Elevation will fall within the Normal Operating Range, but it may not always be the average of the Normal Minimum and Normal Maximum Elevations.

10. Normal Operating Range for Lake Levels – the band of reservoir levels within which the Licensee normally attempts to maintain a given reservoir that it operates on a given day. Each reservoir has its own specific Normal Operating Range, and that range is bounded by a Normal Maximum Elevation and a Normal Minimum Elevation. If inflows and outflows to the reservoir are kept within some reasonable tolerance of the average or

expected amounts, hydro project equipment is operating properly and no protocols for abnormal conditions have been implemented, reservoir level excursions outside of the Normal Operating Range should not occur. (Note: See Item 17 below for special drought storage considerations). Assume the new license for this project will include requirements for the following Normal Operating Range:

Month	Normal Minimum Elevation (ft)	Normal Target Elevation (ft)	Normal Maximum Elevation (ft)
Jan	73	78	83
Feb	76	83	88
Mar	78	88	93
Apr	85	93	98
May	93	97	99.5
Jun	93	97	99.5
Jul	93	97	99.5
Aug	91	96	99.5
Sep	88	93	98
Oct	83	88	93
Nov	78	83	88
Dec	73	78	83

Note: The above are the Normal Maximum, Normal Minimum and Normal Target Elevations for the first day of each month. The Normal Maximum, Normal Minimum and Normal Target Elevations for any other day of the month can be determined by linear interpolation.

11. Net inflow – The cumulative inflow into a reservoir, usually expressed in ac-ft per week or ac-ft per month that is available for generation of hydroelectricity or for supplying non-generation water demands. Net inflow is the sum of tributary stream flow, groundwater runoff, precipitation falling on the reservoir surface, surface runoff and point-source discharge flows, less the sum of net on-reservoir water withdrawals, groundwater recharge and evaporation.

12. Normal Minimum Generation Volume – the minimum amount of net inflow, expressed in ac-ft per month, ac-ft per week or MWH of electric generation per week that is normally reserved in a hydro reservoir for release through the hydro turbines, producing hydroelectricity. For purposes of this low inflow protocol, the following are the Normal Minimum Generation Volumes for the Nantahala Project:

Period	**Normal Minimum Generation Volume (ac-ft / week)**	**Corresponding Energy Production (MWH / week)**
May - Feb	2430	2324
Mar	1519	1453
Apr	1822	1743

Note: The above water volumes and generation amounts assume that the new runner at Nantahala Hydro Station is operating at its Best Efficiency Point and is producing 41.5 MW and releasing 525 cfs for 8 hrs per day, 7 days per week from May through February; 5 hrs per day, 7 days per week in March and 6 hrs per day, 7 days per week in April**.** The above water volumes and generation amounts include both the energy produced by the hydro turbine during generation releases to support downstream recreation as well as energy produced during other periods of unit dispatch to meet the Licensee's electric customers' needs. To the maximum practical extent, when the weekly minimum generation volumes are reduced in the LIP, the reductions will be shared equally between the MWH/week that are reserved to make generation releases to support downstream recreation and generation releases (i.e. dispatch) to support electric customers' needs.

13. Threshold Minimum Flows – the minimum flow release amounts from hydro project works that may be necessary to sustain aquatic communities consistent with the resource management goals and objectives for the affected stream reaches. Since the normal minimum flow releases are for water quality and / or aquatic species habitat enhancements, the Threshold Minimum Flows are related to and lower than the normal minimum flow releases required by the FERC license. For the purposes of this protocol, it is assumed that the Threshold Minimum Flows are as follows:

    a. Whiteoak Creek Bypass - 2 cfs or inflow into Whiteoak Pond, whichever is less, released from Whiteoak Diversion Dam into the Whiteoak Creek Bypass.

    b. Nantahala River Bypass – The following combined flowrates released from the two Spill Valves on the Whiteoak Penstock:

        1) From November 1 through May 31 – 2 cfs
        2) From June 1 through October 31 – 5 cfs.

14. Priority of Reducing Minimum Flows – when making reductions in minimum flows in the bypass reaches, the following priority will be used, reducing each release point to its Threshold Minimum Flow value before moving to the next release point:

    a. Reduce the spill at Whiteoak Diversion Dam
    b. Reduce the flowrates from the Spill Valves on the Whiteoak Penstock

15. Normal Minimum Non-Generation Volume – the minimum amount of net inflow, usually expressed in ac-ft per month or ac-ft per week that is normally reserved in a hydro reservoir to account for the portion of net inflow that leaves the reservoir without producing hydroelectricity. Examples include leakage from the main dam(s), diversion dam(s), penstock(s) or hydro turbine(s) into surface water; releases from flood, sluice and trash gates; and releases from minimum flow devices.

16. Low inflow period - any period when net inflow to a reservoir is not sufficient to maintain the reservoir's elevation above the Normal Minimum Elevation, while still providing the Normal Minimum Generation Volume, and the Normal Minimum Non-Generation Volume.

17. Drought Storage Considerations - the Licensee will be allowed to raise the reservoir to levels above the Normal Maximum Elevation when water is available during periods of extended drought.

18. Threshold Bypass Whitewater Recreation Release – the duration and target flowrate below which Tainter gate releases in the bypass to support whitewater boating can no longer achieve their intended purpose due to very short run times or too much contact with the riverbed. For the purpose of this protocol, the Threshold Bypass Whitewater Recreation Release is 175 cfs (target flowrate immediately below the confluence of Whiteoak Creek with the Nantahala River (i.e. approximately 5.8 river miles downstream of Nantahala Dam)) for 2 hours duration.

19. Priority of Reducing Tainter Gate Releases for Whitewater Recreation – when making reductions in Tainter gate releases for whitewater recreation in the Nantahala River Bypass, the duration of the release should be reduced first until it reaches the above stated threshold duration, then the target flowrates should be reduced until the threshold flowrate is reached. If there is a 2-hr release planned for each of two consecutive days, then it's preferable to have a single 4-hr release than two, 2-hr releases. For days where the scheduled release included hours at two different target flowrates, the reduction should be made in the following order:

a. Reduce duration of the release for the lower scheduled flowrate in steps until the duration equals the above stated threshold duration (see Item 18 above).
b. Reduce duration of the release for the higher scheduled flowrate in steps until the duration equals the above stated threshold duration (see Item 18 above).
c. Reduce targeted flowrate of the release for the lower scheduled flowrate in steps until it equals the above stated threshold flowrate (see Item 18 above).
d. Reduce targeted flowrate of the release for the higher scheduled flowrate in steps until it equals the above stated threshold flowrate (see Item 18 above).

20. Relationship Between this Protocol and the Hydro Project Maintenance & Emergency Protocol (HPMEP) – The HPMEP outlines the general approach the Licensee will take under certain emergency and equipment failure and maintenance situations to continue practical and safe operation of the hydro project, to mitigate any related impacts to license conditions and to communicate with resource agencies and the affected parties. Under the HPMEP, temporary modifications of minimum flow releases in bypass channels, generation releases, Tainter gate releases for recreation and the lake level operating range are allowed. Except for an outage of the Whiteoak Penstock or Diversion Dam or a stuck-open Tainter gate on Nantahala Dam, lowering levels of Nantahala Lake caused by situations addressed under the HPMEP will not invoke implementation of this Low Inflow Protocol (LIP). Also, if the LIP has already been implemented at the time that a situation covered by the HPMEP is initiated, the Licensee will typically suspend implementation of the LIP until the HPMEP situation has been eliminated. The Licensee may however choose to continue with the LIP if desirable.

21. Organizational abbreviations include the NC Division of Water Resources (NCDWR), NC Wildlife Resources Commission (NCWRC), United States Forest Service (USFS), United States Fish & Wildlife Service (USFWS), American Whitewater Affiliation (AW), United States Geologic Survey (USGS) and the Nantahala Gorge Association (NGA).

22. Safety and Electric System Integrity are of Utmost Importance – Nothing in this protocol will limit the Licensee's ability to take any and all lawful actions necessary at its hydro projects to protect human health and safety, protect its equipment from major damage and ensure the stability of the regional electric grid. It is recognized that the Licensee may take the steps that are necessary to protect these things without prior consultation or notification.

Procedure

During low inflow periods as defined above, the Licensee will follow the protocol set forth below regarding adjustments to generation amounts, minimum flow releases, Tainter gate releases from Nantahala Dam for recreation, and minimum reservoir elevations and will make the adjustments set forth below on a **weekly** basis so as to equitably allocate the impacts of reduced water availability:

Stage 1 Reductions:

1. Upon a determination by the Licensee that the reservoir elevation cannot be maintained at or above the Normal Minimum Elevation for the time of year specified above, the Licensee will reduce minimum generation volume to a lower amount (referred to as the Stage 1 Minimum Generation Volume and expressed in MWH/wk) as determined below:

Period	Normal Min. Generation Volume (MWH/wk)	Stage 1 Min. Generation Volume (MWH/wk)	% Reduction From Normal Water Volume Used
May 1 – Feb 29	2324	2034	12.5
Mar 1 – Mar 31	1453	1162	20
Apr 1 – Apr 30	1743	1452	16.7

Note: The above reductions represent a one-hour per day reduction in generation from the normal schedules. This reduction will be split equally between the Licensee's dispatch periods and the scheduled generation releases to support downstream recreation. If any additional hours of generation releases were scheduled to support whitewater races or other special events, then those uses will be required to use the modified releases as noted above. The average water volume reduction for the 12-month period represented above is 13.2%.

2. At the same time, the Licensee will reduce the minimum flow release from Whiteoak Diversion Dam to a new flowrate (referred to as the Stage 1 Whiteoak Diversion Dam Minimum Flow and expressed in cfs) as determined below:

Period	Normal Total Min. Flows in the Bypasses (cfs)	Normal Min. Flow at Whiteoak Diversion Dam (cfs)	Stage 1 Whiteoak Diversion Dam Min. Flow (cfs)	% Reduction From Normal Water Volume Used
Nov 1 – May 31	16	8 cfs or inflow to Whiteoak Pond, whichever is less	6	12.5
Jun 1 – Oct 31	24	8 cfs or inflow to Whiteoak Pond, whichever is less	5	12.5

3. At the same time, if recreation releases from the Nantahala Dam are scheduled during Stage 1 reductions, then the releases will be reduced as noted below:

Tainter Gate Release	Normally Scheduled Duration and Target Flowrates (*) (hrs and cfs)	Stage 1 Duration and Target Flowrates (*) (hrs and cfs)	% Reduction From Normal Water Volume Used
Spring Weekend in April	Sat. - 6-hr release @ 250 cfs Sun. - 6-hr release@ 350 cfs	Sat. - 5-hr release @ 250 cfs Sun.- 5-hr release@ 350 cfs	16.7
Summertime Afternoons between June 15 and August 31	3-hr release @ 250 cfs	2-hr release @ 250 cfs	33.3
Fall Weekend between September 15 and September 30	Sat. – 7-hr release @ 300 cfs Sun. – 5-hr release @ 425 cfs, 2-hr release @ 250 cfs	Sat. – 6-hr release @ 300 cfs Sun. – 4-hr release @ 425 cfs, 2-hr release @ 250 cfs	15.3

Note: * Target flowrates are just below the confluence of Whiteoak Creek and the Nantahala River.

4. At the same time, the Licensee will reduce the reservoir's Normal Minimum Elevation by three feet for the relevant time period as shown above. The newly modified minimum elevation is referred to as the Stage 1

Minimum Elevation. (Note: Three feet represents 11% of the total 26.5-ft bandwidth provided by the Normal Operating Range).

5. The Licensee will directly notify NCDWR, NCWRC, USFWS, USFS, the NGA President and the AW representative when Stage 1 reductions are implemented and will endeavor in good faith to provide at least 24 hours advance notification. If additional generation releases were scheduled to support whitewater races or other special events, the Licensee will include the event sponsor in this direct notification.

6. The Licensee will update its website and telephone messages to account for the impacts of the above LIP on schedules for generation and bypass recreational releases and lake levels.

Stage 2 Reductions

1. Upon a determination by the Licensee that the reservoir elevation cannot be maintained at or above the Stage 1 Minimum Elevation for the time of year specified above, the Licensee will reduce the minimum generation volume to a lower amount (referred to as the Stage 2 Minimum Generation Volume and expressed in MWH/wk) as determined below:

Period	Normal Min. Generation Volume (MWH/wk)	Stage 2 Min. Generation Volume (MWH/wk)	% Reduction From Normal Water Volume Used
May 1 – Feb 29	2324	1743	25
Mar 1 – Mar 31	1453	872	40
Apr 1 – Apr 30	1743	1162	33.4

Note: The above reductions represent a two-hour per day reduction in generation from the normal schedules. This reduction will be split equally between the Licensee's dispatch periods and the scheduled generation releases to support downstream recreation. If any additional hours of generation releases were scheduled to support whitewater races or other special events, then those uses will be required to use the modified releases as noted above. The average water volume reduction for the12-month period represented above is 26.4%.

2. At the same time, the Licensee will reduce the minimum flow release from Whiteoak Diversion Dam to a new flowrate (referred to as the Stage 2 Whiteoak Diversion Dam Minimum Flow and expressed in cfs) as determined below:

Period	Normal Total Min. Flows in the Bypasses (cfs)	Normal Min. Flow at Whiteoak Diversion Dam (cfs)	Stage 2 Whiteoak Diversion Dam Min. Flow (cfs)	% Reduction From Normal Water Volume Used
Nov 1 – May 31	16	8 cfs or inflow to Whiteoak Pond, whichever is less	4	25.0
Jun 1 – Oct 31	24	8 cfs or inflow to Whiteoak Pond, whichever is less	2 (*)	25.0

Note: * 2 cfs is the Threshold Minimum Flow for this location.

3. At the same time, if recreation releases from the Nantahala Dam are scheduled during Stage 2 reductions, then the releases will be reduced as noted below:

Tainter Gate Release	Normally Scheduled Duration and Target Flowrates (*) (hrs and cfs)	Stage 2 Duration and Target Flowrates (*) (hrs and cfs)	% Reduction From Normal Water Volume Used
Spring Weekend in April	Sat. - 6-hr release @ 250 cfs Sun. - 6-hr release@ 350 cfs	Sat. - 4-hr release @ 250 cfs Sun.- 4-hr release@ 350 cfs	33.3
Summertime Afternoons between June 15 and August 31	3-hr release @ 250 cfs	2-hr release @ 250 cfs	33.3
Fall Weekend between September 15 and September 30	Sat. – 7-hr release @ 300 cfs Sun. – 5-hr release @ 425 cfs, 2-hr release @ 250 cfs	Sat. – 5-hr release @ 300 cfs Sun. – 3-hr release @ 425 cfs, 2-hr release @ 250 cfs	28.6

Notes: * Target flowrates are just below the confluence of Whiteoak Creek and the Nantahala River.

4. At the same time, the Licensee will reduce the reservoir's minimum elevation by an additional three feet (six feet total below the Normal Minimum Elevation) for the relevant time period as shown above. The newly modified minimum elevation is referred to as the Stage 2 Minimum Elevation. (Note: Six feet represents 23% of the total 26.5-ft bandwidth provided by the Normal Operating Range).

5. The Licensee will directly notify the NGA President and the AW representative when Stage 2 reductions are implemented and will endeavor in good faith to provide at least 24 hours advance notification. If additional generation releases were scheduled to support whitewater races or other special events, the Licensee will include the event sponsor in this direct notification.

6. The Licensee will update its website and telephone messages to account for the impacts of the above LIP on schedules for generation and bypass recreational releases and lake levels.

Stage 3 Reductions

1. Upon a determination by the Licensee that the reservoir elevation cannot be maintained at or above the Stage 2 Minimum Elevation for the time of year specified above, the Licensee will reduce the minimum generation volume to a lower amount (referred to as the Stage 3 Minimum Generation Volume and expressed in MWH/wk) as determined below:

Period	Normal Min. Generation Volume (MWH/wk)	Stage 3 Min. Generation Volume (MWH/wk)	% Reduction From Normal Water Volume Used
May 1 – Feb 29	2324	1453	37.5
Mar 1 – Mar 31	1453	581	60
Apr 1 – Apr 30	1743	871	50.1

Note: The above reductions represent a three-hour per day reduction in generation from the normal schedules. This reduction will be split equally between the Licensee's dispatch periods and the scheduled generation releases to support downstream recreation. If any additional hours of generation releases were scheduled to support whitewater races or other special events, then those uses will be required to use the modified releases as noted above. The average water volume reduction for the12-month period represented above is 39.5%.

2. At the same time, the Licensee will reduce the minimum flow release from Whiteoak Diversion Dam to its Threshold Minimum Flow value of 2 cfs or inflow to Whiteoak Pond, whichever is less.

3. At the same time, the Licensee will reduce the minimum flow release from the spill valves located on the Whiteoak Penstock to a new combined flowrate (referred to as the Stage 3 Whiteoak Penstock Combined Valve Flow and expressed in cfs) as determined below:

Period	Normal Total Min. Flows in the Bypasses (cfs)	Normal Combined Min. Flow From the Whiteoak Penstock Spill Valves (cfs)	Stage 3 Whiteoak Penstock Combined Valve Flow (cfs)	% Reduction From Normal Water Volume Used (*)
Nov 1 – May 31	16	8	8	37.5
Jun 1 – Oct 31	24	16	13	37.5

Notes: * % reductions include the 6 cfs minimum flow reduction implemented at Whiteoak Diversion Dam.

4. At the same time, if recreation releases from the Nantahala Dam are scheduled during Stage 3 reductions, then the releases will be reduced as noted below:

Tainter Gate Release	Normally Scheduled Duration and Target Flowrates (*) (hrs and cfs)	Stage 3 Duration and Target Flowrates (*) (hrs and cfs)	% Reduction From Normal Water Volume Used
Spring Weekend in April	Sat. - 6-hr release @ 250 cfs Sun. - 6-hr release@ 350 cfs	Sat. - 3-hr release @ 250 cfs Sun.- 3-hr release@ 350 cfs	50
Summertime Afternoons between June 15 and August 31	3-hr release @ 250 cfs	2-hr release @ 175 cfs (**)	46.7
Fall Weekend between September 15 and September 30	Sat. – 7-hr release @ 300 cfs Sun. – 5-hr release @ 425 cfs, 2-hr release @ 250 cfs	Sat. – 4-hr release @ 300 cfs Sun. – 2-hr release @ 425 cfs, 2-hr release @ 250 cfs	46.0

Notes: * Target flowrates are just below the confluence of Whiteoak Creek and the Nantahala River.

** The Threshold Bypass Whitewater Recreation Release is 2-hr @ 175 cfs.

5. At the same time, the Licensee will reduce the reservoir's minimum elevation by an additional three feet (nine feet total below the Normal Minimum Elevation) for the relevant time period as shown above. The newly modified minimum elevation is referred to as the Stage 3 Minimum Elevation. (Note: Nine feet represents 34% of the total 26.5-ft bandwidth provided by the Normal Operating Range).

6. The Licensee will directly notify the NGA President and the AW representative when Stage 3 reductions are implemented and will endeavor in good faith to provide at least 24 hours advance notification. If additional generation releases were scheduled to support whitewater races or other special events, the Licensee will include the event sponsor in this direct notification.

7. The Licensee will update its website and telephone messages to account for the impacts of the above LIP on schedules for generation and bypass recreational releases and lake levels.

Stage 4 Reductions

1. Upon a determination by the Licensee that the reservoir elevation cannot be maintained at or above the Stage 3 Minimum Elevation for the time of year specified above, the Licensee will reduce the minimum generation volume to a lower amount (referred to as the Stage 4 Minimum Generation Volume and expressed in MWH/wk) as determined below:

Period	Normal Min. Generation Volume (MWH/wk)	Stage 4 Min. Generation Volume (MWH/wk)	% Reduction From Normal Water Volume Used
May 1 – Feb 29	2324	1162	50
Mar 1 – Mar 31	1453	290	80
Apr 1 – Apr 30	1743	580	66.8

Note: The above reductions represent a four-hour per day reduction in generation from the normal schedules. This reduction will be split equally between the Licensee's dispatch periods and the scheduled generation releases to support downstream recreation. If any additional hours of generation releases were scheduled to support whitewater races or other special events, then those uses will be required to use the modified releases as noted above. The average water volume reduction for the 12-month period represented above is 52.8%.

2. At the same time, the Licensee will maintain the minimum flow release from Whiteoak Diversion Dam at its Threshold Minimum Flow value of 2 cfs or inflow to Whiteoak Pond, whichever is less. (Note: This is the same as the Stage 3 Whiteoak Diversion Dam Minimum Flow).

3. At the same time, the Licensee will reduce the minimum flow release from the spill valves located on the Whiteoak Penstock to a new combined flowrate (referred to as the Stage 4 Whiteoak Penstock Combined Valve Flow and expressed in cfs) as determined below:

Period	Normal Total Min. Flows in the Bypasses (cfs)	Normal Combined Min. Flow From the Whiteoak Penstock Spill Valves (cfs)	Stage 4 Whiteoak Penstock Combined Valve Flow (cfs)	% Reduction From Normal Water Volume Used (*)
Nov 1 – May 31	16	8	6	50.0
Jun 1 – Oct 31	24	16	9	54.2

Notes: * % reductions include the 6 cfs minimum flow reduction implemented at Whiteoak Diversion Dam.

4. At the same time, if recreation releases from the Nantahala Dam are scheduled during Stage 4 reductions, then the releases will be reduced as noted below:

Tainter Gate Release	Normally Scheduled Duration and Target Flowrates (*) (hrs and cfs)	Stage 4 Duration and Target Flowrates (*) (hrs and cfs)	% Reduction From Normal Water Volume Used
Spring Weekend in April	Sat. - 6-hr release @ 250 cfs Sun. - 6-hr release@ 350 cfs	Sat. - 2-hr release @ 250 cfs Sun.- 2-hr release@ 350 cfs	66.7
Summertime Afternoons between June 15 and August 31	3-hr release @ 250 cfs	2-hr release @ 175 cfs (**)	46.7
Fall Weekend between September 15 and September 30	Sat. – 7-hr release @ 300 cfs Sun. – 5-hr release @ 425 cfs, 2-hr release @ 250 cfs	Sat. – 3-hr release @ 300 cfs Sun. – 2-hr release @ 425 cfs, 2-hr release @ 175 cfs (**)	55.6

Notes: * Target flowrates are just below the confluence of Whiteoak Creek and the Nantahala River.
** The Threshold Bypass Whitewater Recreation Release is 2-hr @ 175 cfs.

5. At the same time, the Licensee will reduce the reservoir's minimum elevation by an additional three feet (twelve feet total below the Normal Minimum Elevation) for the relevant time period as shown above. The newly modified minimum elevation is referred to as the Stage 4 Minimum Elevation. (Note: Twelve feet represents 45% of the total 26.5-ft bandwidth provided by the Normal Operating Range).

6. The Licensee will directly notify the NGA President and the AW representative when Stage 4 reductions are implemented and will endeavor in good faith to provide at least 24 hours advance notification. If additional generation releases were scheduled to support whitewater races or other special events, the Licensee will include the event sponsor in this direct notification.

7. The Licensee will update its website and telephone messages to account for the impacts of the above LIP on schedules for generation and bypass recreational releases and lake levels.

Stage 5 Reductions

1. Upon a determination by the Licensee that the reservoir elevation cannot be maintained at or above the Stage 4 Minimum Elevation for the time of year specified above, the Licensee will reduce the minimum generation

volume to a lower amount (referred to as the Stage 5 Minimum Generation Volume and expressed in MWH/wk) as determined below:

Period	Normal Min. Generation Volume (MWH/wk)	Stage 5 Min. Generation Volume (MWH/wk)	% Reduction From Normal Water Volume Used
May 1 – Feb 29	2324	872	62.5
Mar 1 – Mar 31	1453	290	80
Apr 1 – Apr 30	1743	290	83.4

Note: The above reductions represent a five-hour per day reduction in generation from the normal schedules in Apr – Feb, with only a four-hour reduction in Mar. March generation was kept at one hour per day to ensure some continued generation and flow in the main stem of the river. These reductions will be split equally between the Licensee's dispatch periods and the scheduled generation releases to support downstream recreation. If any additional hours of generation releases were scheduled to support whitewater races or other special events, then those uses will be required to use the modified releases as noted above. The average water volume reduction for the12-month period represented above is 64.8%.

2. At the same time, the Licensee will maintain the minimum flow release from Whiteoak Diversion Dam at its Threshold Minimum Flow value of 2 cfs or inflow to Whiteoak Pond, whichever is less. (Note: This is the same as the Stage 3 Whiteoak Diversion Dam Minimum Flow).

3. At the same time, the Licensee will reduce the minimum flow release from the spill valves located on the Whiteoak Penstock to a new combined flowrate (referred to as the Stage 5 Whiteoak Penstock Combined Valve Flow and expressed in cfs) as determined below:

Period	Normal Total Min. Flows in the Bypasses (cfs)	Normal Combined Min. Flow From the Whiteoak Penstock Spill Valves (cfs)	Stage 5 Whiteoak Penstock Combined Valve Flow (cfs)	% Reduction From Normal Water Volume Used (*)
Nov 1 – May 31	16	8	4	62.5
Jun 1 – Oct 31	24	16	6	66.7

Notes: * % reductions include the 6 cfs minimum flow reduction implemented at Whiteoak Diversion Dam.

4. At the same time, if recreation releases from the Nantahala Dam are scheduled during Stage 5 reductions, then the releases will be reduced as noted below:

Tainter Gate Release	Normally Scheduled Duration and Target Flowrates (*) (hrs and cfs)	Stage 5 Duration and Target Flowrates (*) (hrs and cfs)	% Reduction From Normal Water Volume Used
Spring Weekend in April	Sat. - 6-hr release @ 250 cfs Sun. - 6-hr release@ 350 cfs	Sat. - 4-hr release @ 175 cfs (**) Sun. - No release.	80.6
Summertime Afternoons between June 15 and August 31	3-hr release @ 250 cfs	2-hr release @ 175 cfs (**)	46.7
Fall Weekend between September 15 and September 30	Sat. – 7-hr release @ 300 cfs Sun. – 5-hr release @ 425 cfs, 2-hr release @ 250 cfs	Sat. - 4-hr release @ 175 cfs (**) Sun. - No release.	85.2

Notes: * Target flowrates are just below the confluence of Whiteoak Creek and the Nantahala River.

** The Threshold Bypass Whitewater Recreation Release is 2-hr @ 175 cfs.

5. At the same time, the Licensee will reduce the reservoir's minimum elevation by an additional three feet (fifteen feet total below the Normal Minimum Elevation) for the relevant time period as shown above. The newly modified minimum elevation is referred to as the Stage 5 Minimum Elevation. (Note: Fifteen feet represents 57% of the total 26.5-ft bandwidth provided by the Normal Operating Range).

6. The Licensee will directly notify the NGA President and the AW representative when Stage 5 reductions are implemented and will endeavor in good faith to provide at least 24 hours advance notification. If additional generation releases were scheduled to support whitewater races or other special events, the Licensee will include the event sponsor in this direct notification.

7. The Licensee will update its website and telephone messages to account for the impacts of the above LIP on schedules for generation and bypass recreational releases and lake levels.

Stage 6 Reductions and Beyond

1. Upon a determination by the Licensee that the reservoir elevation cannot be maintained at or above the Stage 5 Minimum Elevation, the Licensee will continue with the conditions as established by the Stage 5 reductions, except for Stage 6 and beyond:

    a. All Tainter gate releases for whitewater recreation in the bypass are cancelled
    b. The Whiteoak Penstock Combined Valve Flow will be maintained at the Threshold Minimum Flow of 2 cfs (November 1 through May 31) or 5 cfs (June 1 through October 31)
    c. The minimum generation volume for the May 1 through February 29 period will be reduced by an additional hour per day for each stage until it reaches 290 MWH/wk (i.e. 1 hour per day of generation, 7 days per week). This reduction will be split equally between the Licensee's dispatch periods and the scheduled generation releases to support downstream recreation.
    d. The minimum lake elevation will be reduced by an additional three feet for each stage.

2. Once the minimum generation volume has been reduced to one hour per day, 7 days a week for all parts of the year (i.e. 290 MWH/wk), all recreation releases in the bypass have been cancelled and all minimum flows are being maintained at their Threshold Minimum Flow values, the minimum lake elevation requirement will no longer apply.

3. The Licensee will directly notify the NGA President and the AW representative when Stage 6 reductions and each successive stage reductions are implemented and will endeavor in good faith to provide at least 24 hours advance notification. If additional generation releases were scheduled to support whitewater races or other special events, the Licensee will include the event sponsor in this direct notification.

4. The Licensee will update its website and telephone messages to account for the impacts of the above LIP on schedules for generation and bypass recreational releases and lake levels.

Recovery from the Low Inflow Protocol

1. When inflows have increased to a point where the Licensee can maintain lake level above the minimum elevation established in the previous stage reduction, operation of the project can begin transitioning out of the LIP. The transitioning procedure will follow the stage reductions outlined above in reverse order (i.e. "stage increases" going from the last stage achieved back toward Stage 1 and then finally returning to normal operation).

2. The Licensee will directly notify the NGA President and the AW representative as the LIP stages are transitioned and will endeavor in good faith to provide at least 24 hours advance notification. If additional generation releases were scheduled to support whitewater races or other special events, the Licensee will include the event sponsor in this direct notification.

3. The Licensee will directly notify the NCDWR, NCWRC, USFWS, USFS, the NGA President and the AW representative when lake levels have been restored to within the Normal Operating Range with a normal generation schedule, normal minimum flows in the bypasses and a normal schedule for Tainter gate releases to support whitewater boating in the Nantahala River Bypass. If additional generation releases were scheduled to support whitewater races or other special events, the Licensee will include the event sponsor in this direct notification.

4. The Licensee will update its website and telephone messages to account for the impacts of the above LIP on schedules for generation and bypass recreational releases and lake levels.