



Connecticut Department of Energy and Environmental Protection

Plan for Making Streamflow Releases

Guidance Document

Introduction

Dam owners that must make releases in accordance with the Stream Flow Regulations (§26-141b-1 to 26-141b-8 of the Regulations of Connecticut State Agencies (RCSA)), are required to submit a description, or plan, for making such releases to the Department of Energy & Environmental Protection (DEEP) for the Commissioner's approval (RCSA §26-141b-7(c)(1)). The purpose of this guidance document is to assist dam owners in developing such a plan.

What are the required elements of the Plan?

The Stream Flow Regulations require dam owners to submit a description of the “methods and locations to be used to calculate release flows and demonstrate compliance with release flow requirements” (the “Plan”) for the Commissioner's approval. The Plan “shall include practices used to manage the water quality of the release to the maximum extent practicable for the protection of downstream resources”. Therefore, to provide context and a framework, DEEP recommends the following elements be included in the Plan:

1. Site and owner description
2. Release volume required by the regulations, including the United States Geological Survey (USGS) National Streamflow Statistics (NSS) Reports and the USGS StreamStats report
3. Practices used to manage the water quality of the release to the maximum extent practicable
4. Release location on the dam and description of release structure
5. Method to calculate release flows and natural inflow
6. Reporting requirements
7. Natural Diversity Database (NDDB) Determination

Further discussion of each element is presented in subsequent sections of this document.

1. Site and Owner Description

Please include the following information:

- Name of dam
- DEEP Dam ID#
- Alternate dam or pond name (if applicable)
- Purpose of dam and impoundment (public water supply, recreation...)
- Brief description of the dam (~60 ft by 30 ft, earthen dam...)
- Dam owner name and contact information: mailing address, email, phone number
- Latitude/Longitude location of the dam

2. Required Release

The releases required from a dam are specified in [RCSA §26-141b-6](#), consistent with the classification of the stream or river segment immediately downstream of the dam and the bioperiod. The regulations contain several variables that may affect the required release which are specific to the individual dam and its use. Please take the time to review subsection 6 of the regulations to determine what releases are applicable.

The most common release frameworks are the multi-level release under subsection 6(a)(3) (excerpted below); or a minimum of the rearing and growth bioperiod Q80 or natural inflow whichever is less, as specified under subsection 6(a)(5) (excerpted below).

Excerpt from §26-141b-6(a)(3):

Release the following minimum continuous flow if the release is into a river or stream segment designated as Class 3:

Bioperiod	Effective Dates	Minimum Required Release	
		Antecedent Period Dry*	Antecedent Period Wet**
Overwinter	Dec 1 – Feb 28/29	Bioperiod Q99	
Habitat Forming	Mar 1 – Apr 30	Bioperiod Q99	
Clupeid Spawning	May 1 – May 31	Bioperiod Q95	
Resident Spawning	June 1 – June 30	Bioperiod Q90	
Rearing and Growth	July 1 – Oct 31	Bioperiod Q80	Bioperiod Q50
Salmonid Spawning	Nov 1 – Nov 30	Bioperiod Q90	

**The dry period release shall be required when the median natural flow during the antecedent period is less than the bioperiod Q25*

***The wet period release shall be required when the median natural flow during the antecedent period equals or exceeds the bioperiod Q25*

Excerpt from §26-141b-6(a)(5):

You may release a minimum of the rearing and growth bioperiod Q80 or the natural inflow of water, whichever is less, IF:

- If the dam impounds a river or stream system with an upstream, natural drainage are of three square miles or less
- If the dam releases to a river or stream system that flows for a distance of one and one-half miles or less before discharging into an impoundment, and provided release from the downstream dam, or the most downstream dam if in a series, comply with the release requirements
- If the dam impounds a reservoir with usable storage of 100 million gallons or less

Please specify what release requirement is applicable to your dam. If your dam is allowed to make the rearing and growth bioperiod Q80 release, please specify the reason (i.e., three square miles or less).

The release shall be calculated and the release rate adjusted, if necessary, on the first day and the fifteenth day of every month unless such day falls on a weekend or holiday in which case the required release shall be calculated and the release rate adjusted on the next business day.

Once the applicable requirement is determined, please use the attached “*Instructions for Calculating Flow Statistics using the USGS National Streamflow Statistics (NSS) website and USGS StreamStats application*” to determine the actual flow volumes required to be released. Please attach a copy of the reports NSS and StreamStats generate and summarize the applicable release volumes in your Plan. Please note that these values are subject to change based on the best available science.

3. Water Quality Considerations

The goal of these regulatory requirements is to make streamflow releases to support downstream ecosystems, and the regulations explicitly require the Plan to include practices used to manage the water quality of the release to the maximum extent practicable for the protection of downstream resources (§26-141b-7(c)(1)).

The water quality of the released water is an important consideration, particularly the dissolved oxygen and temperature of the released water. In general, a mid-level release is recommended so that cooler, oxygenated waters from the middle of the water column in the pool behind the dam are released. To that end, DEEP recommends that waters are not released from the surface nor bottom of the water column. This recommendation may be modified if the applicant can demonstrate that the water being discharged is of appropriate quality to support the oxygen and temperature requirements of downstream biota. Water quality standards are based on the Water Quality Classification of the receiving stream. Water Quality Classifications can be found on the [CT Water Quality Classification Interactive Map](#). Surface water criteria by classification for DO and temperature are provided in the table below.

Parameter	Classes AA, A, and B	Classes SA and SB
Dissolved Oxygen	Not less than 5 mg/l at any time.	Acute: Not less than 3.0 mg/l. Chronic: Not less than 4.8 mg/l with cumulative periods of dissolved oxygen in the 3.0 – 4.8 mg/l range as detailed in Note 1 to this table.
Temperature	There shall be no changes from natural conditions that would impair any existing or designated uses assigned to this Class and in no case exceed 85° F, or in any case raise the temperature of surface water more than 4° F.	There shall be no changes from natural conditions that would impair any existing or designated uses assigned to this Class and, in no case exceed 83° F, or in any case raise the temperature of the receiving water more than 4° F. During the period including July, August and September, the temperature of the receiving water shall not be raised more than 1.5° F unless it can be shown that spawning and growth of

		indigenous organism will not be significantly affected. The allowable temperature increase resulting from discharges in the estuarine segments of the Housatonic, Connecticut and Thames Rivers shall be consistent with the criteria for the non-tidal segments.
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Please discuss how you will ensure good water quality for the stream flow releases in the Plan.

4. Release location and description of release structure

Please briefly describe the release location and structure with respect to the dam and pool behind the dam. A diagram would be helpful for this, and please include:

- Elevation of release structure in relation to full pool elevation. This information is helpful to determine if the release will be a bottom-level release, mid-level release, or top-level release.
- Size and flow capacity of release structure
- Short description of the control mechanism and how it will be operated to ensure the required releases

5. Method to calculate release flows

Streamflow releases should be measured or calculated as close to the dam outlet as possible. For example, an inline flow meter can be installed near the end of the outlet pipe before the water is released into the stream. If velocities are too low and/or depths are too shallow for a reliable meter measurement of streamflow, a V-notch weir can be used in a Parshall flume to calculate flows. Portable meter technologies and data collection have advanced greatly in the past two decades. Consultation with flow meter vendors is recommended to determine the best set up for each dam outlet.

How to measure natural inflow:

Similar to calculating release flows, a V-notch weir can be used in a Parshall flume to calculate the natural inflow to the reservoir. A dam owner can also estimate the natural inflow by using a surrogate USGS stream gage. Some important factors to look at when choosing a surrogate stream gage include:

- Do the release site and surrogate gage experience similar precipitation and temperature ranges over the year?
- Is the percent stratified drift in the watershed above the release site and the surrogate gage similar? The closer these numbers are, the better.

Please describe how you plan to measure the natural inflow. If you will be using a surrogate stream gage to estimate the natural inflow, please specify which stream gage you will be using, and the reasoning for choosing that stream gage.

Multi-Level Release: How to determine rearing and growth bioperiod releases from July 1 – Oct 31:

Note: this section is only applicable to dams which are required to make the multi-level release.

The rearing and growth bioperiod release will either be Q80 or Q50 depending on the antecedent period. These flows can be obtained using the attached “*Instructions for Calculating Flow Statistics using the USGS National Streamflow Statistics (NSS) website and USGS StreamStats application*”. Refer to the descriptions below to determine if the release should be Q80 or Q50.

Antecedent Period Dry – the dry period release is required when the median natural flow during the antecedent period (or the previous 14 days from when the required release is calculated) is **less than** the bioperiod Q25. For example, if the rearing and growth bioperiod Q25 of a stream downstream of a reservoir is 10.9 cfs, and the median natural inflow to the reservoir during the past 14 days is less than 10.9 cfs, the rearing and growth bioperiod Q80 of 2.14 cfs would be required.

Antecedent Period Wet – the wet period release is required when the median natural flow during the antecedent period **equals or exceeds** the bioperiod Q25. For example, if the rearing and growth bioperiod Q25 of a stream downstream of a reservoir is 10.9 cfs, and the median natural inflow to the reservoir during the past 14 days is equal to or greater than 10.9 cfs, the rearing and growth bioperiod Q50 of 4.98 cfs would be required.

6. Reporting Requirement

All dam owners must comply with the record keeping and reporting requirements of RCSA §26-141b-7.

Once releases begin, the dam owner needs to maintain an operating log that documents the flow of water released from the dam. An electronic reporting form is available, and annual reporting will be required. The reporting form requires the release rate to be entered daily and presented in cubic feet per second (cfs). Annual reports are due by **March 31** of each year.

When is the Plan due to DEEP?

The deadlines for when dams in each basin are required to submit the Plan are as follows:

Basin(s):	Plan for making releases due to DEEP:
Southeast Coastal, Pawcatuck, Thames	October 7, 2023
South Central Coastal	September 6, 2025
Connecticut	February 20, 2027
Housatonic, Hudson, Southwest Coastal	March 26, 2028

When do I need to begin making stream flow releases?

The stream flow releases must begin no later than ten years after the date of adoption of the stream flow classification for that segment. The dates for when each basin is required to begin making releases are listed in the table below.

Basin(s):	Releases Begin:
Southeast Coastal, Pawcatuck, Thames	October 7, 2024
South Central Coastal	September 6, 2026
Connecticut	February 20, 2028
Housatonic, Hudson, Southwest Coastal	March 26, 2029

7. Natural Diversity Database (NDDDB) Determination

DEEP's Natural Diversity Data Base (NDDDB) reviews projects to determine their impact on state-listed species. Maps are available as a pre-screening tool to help determine if there could be an impact to known locations of state-listed species. Shaded areas ("blobs") on the maps show approximate locations of state- and federal-listed species and important natural communities. If a project falls within a shaded area, the applicant must submit a Request for Natural Diversity Data Base State-listed Species Review. When viewing the NDDDB maps, please consider the entire area affected by a project. NDDDB Requests are now available on DEEP's ezFile Portal. Please visit <https://portal.ct.gov/DEEP/NDDDB/Requests-for-NDDDB-Environmental-Reviews> to submit a request.

The Plan should include any NDDDB Preliminary Site Assessments and NDDDB Determinations if applicable.

What Comes Next:

DEEP staff will review the Streamflow Release Plan and contact you with questions and may set up a meeting to discuss the Plan. Once the Plan is approved by the Commissioner of DEEP, a formal approval letter will be sent to you with instructions on how to submit annual streamflow release data.

Additional Information:

The Plan should be emailed to DEEP.Streamflowclass@ct.gov by the applicable deadline.

Information on the Streamflow Regulations is available on the DEEP website at:
<https://portal.ct.gov/DEEP/Water/Stream-Flow-Standards/Connecticut-Stream-Flow-Standards>

Questions can be directed to DEEP.Streamflowclass@ct.gov or melissa.m.czarnowski@ct.gov

Applicable Statutory and Regulatory Citations:

[Connecticut General Statutes §26-141b](#)

Regulations of Connecticut State Agencies [§26-141b-1 through 26-141b-8](#), inclusive

Pertinent Definitions (from RSCA §26-141b-2):

Antecedent period – the fourteen consecutive days immediately preceding the date the required release is calculated pursuant to RSCA section 26-141b-6(a)

Bioperiod – the period during which certain biological processes dependent on stream flow rates occurs or is likely to occur

Maximum extent practicable – able to be constructed or implemented consistent with sound science and engineering principles; and economically and otherwise reasonable in light of the societal and environmental benefits to be gained

Median natural flow – the naturally occurring daily stream flow that is predicted to be equaled or exceeded on fifty percent of days in a period of record calculated using methods developed by the U.S. Geological Survey or otherwise acceptable to the commissioner

Release – the total release of water from a dam to provide for the preservation, protection, and propagation of fish and other forms of aquatic life and includes dam leakage, spillage from a primary spillway, spillage return flow from an auxiliary spillway, and discharge from outlet works