

**EVALUATION - SECTION 404 OF THE CLEAN WATER ACT
DISCHARGE OF SEDIMENTS FROM OR THROUGH A DAM**

**U.S. ARMY CORPS OF ENGINEERS, NEW ENGLAND DISTRICT
CONCORD, MA**

PROJECT: Northfield Brook Dam, Naugatuck River Basin, Connecticut
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A review of the impacts associated with discharges to waters of the United States for the permanent conversion of the Northfield Brook Lake federal flood control facility to a dry-bed, run-of-the river flood control facility in Thomaston, Connecticut is being conducted per Section 404(b)(1) of the Clean Water Act, as amended (Public Law 92-500).

The review is initiated based on the U.S. Army Corps of Engineers (USACE) Regulatory Guidance Letter 05-04 (19 August 2005). This guidance suggest review of the action under Section 404 of the Clean Water Act since the federal action deviates from normal operation of the dam in such a manner that bottom sediment accumulated behind the dam could be removed and transported downstream through the dam. The regulatory guidance applies to the releases of water and water-carried sediment that may result in the transportation, reduction, or elimination of bottom sediment accumulations from or through dams.

DESCRIPTION:

Location. Northfield Brook Lake Flood Damage Reduction Project, Thomaston, Connecticut and surrounding communities.

General Description. The Northfield Brook Lake (Project) is a Federal multi-purpose dam authorized for flood control, recreation, and fish and wildlife habitat. It is located on Northfield Brook, within the Naugatuck River Basin, Connecticut, operated by the Operations Division of the New England District, U.S. Army Corps of Engineers. It is part of the Congressionally-authorized overall flood control plan for the Naugatuck Valley. The flood control facility is within the boundaries of Thomaston and Litchfield, with the actual dam located about 1.3 miles upstream from its confluence with the Naugatuck River, in the town of Thomaston, Litchfield County. The total acreage of the reservoir and project lands is about 235 acres, including 208 acres that are owned by the Federal government and 27 acres held in flowage easement.

Purpose. The Northfield Brook Lake has consistent problems with water quality and increasing sedimentation. It is on the Connecticut Impaired Waters List because it exceeds the water quality standards for recreational uses from elevated levels of *Escherichia coli* from non-point and unknown source pollution. The USACE has a need to address the poor water quality issues and increasing sediment deposition within the reservoir area in a manner that will (1) eliminate the impaired status of the impounded water within the reservoir area, (2) improve sediment management of the area behind the dam and allow a more natural run-of-the-river sediment transport, and (3) increase the overall storage capability by eliminating the long term needs to remove sediment accumulation. Additionally, positive changes to the management of the flood control dam from the permanent conversion to a dry-bed reservoir are expected, and include (4) providing access to new and better recreational opportunities, and (5) minimizing the maintenance costs associated with management of adverse aquatic conditions within the federal flood control project.

Proposed Plan, Preferred Alternative. The U.S. Army Corps of Engineers (USACE), New England District is proposing to take steps to alleviate the negative water quality issues and ongoing sediment accumulation within the reservoir area of the Northfield Brook Dam. The USACE preferred alternative to improve the water quality and minimize sediment accumulation behind the dam is to eliminate the permanent pool that exists behind the dam. This alternative will convert the existing permanent reservoir at the Northfield Brook Lake Federal Flood Control Project in Thomaston, Connecticut to a dry bed reservoir. USACE proposes to empty the reservoir by initiating the release of water behind the dam immediately prior to or during a high rain event and continue to allow the water flow out at a rate where outflow is slightly above inflow and within the outflow limits established for downstream flood control management. This method of dewatering the Northfield Brook Dam is expected to have greater results in replenishing undercut stream banks and fisheries survivability. The method, completed during higher seasonal turbid conditions, would have a closer approximation of a seasonal sediment flow regime which historically moved sediment in the stream during and after high flows such as spring run-off. The Northfield Brook within the emptied reservoir will be restored to a natural free flowing river. The dam will continue to operate for its authorized flood control mission.

General Description of Dredged or Fill Material. There are two types of discharges associated with this project: (1) the existing sediment behind the dam being released downstream during the dewatering of the impounded water behind the dam (2) and, during river restoration, the placement of stone riprap below mean high water along the banks to stabilize certain sections of the banks that may be subject to erosion. The placement of stone riprap for bank stabilization under the Clean Water Act will be addressed separately when a known quantity of material to be placed below the river's mean low water is identified by the site restoration plan.

During drawdown an estimated (up to) 3,000 to 5,000 cubic yards of material may pass through the dam as the impounded water levels reach their lowest as they exit from behind the dam. The sediment consists of fines, sand, and gravel. Water column turbidity is expected to behave in the same manner as observed during routine flood control operations until the water level reaches its lower limits, and sediment migration begins to pick up the material. This method is expected to supply sections of Northfield Brook downstream of the dam with much needed sediments. The result is anticipated to provide beneficial sediment material to sediment-starved sections of Northfield Brook below the dam that has been down cut or has experienced erosion of the bed and banks from the presence of the dam.

Once the drawdown is complete, the Northfield Brook will return to a natural stream channel through the reservoir basin. USACE will work to establish bank stabilization and will require use of stone riprap to stabilize sections of the riverbank that may experience increased erosion and sedimentation. This use of riprap will be integrated into the overall bufferzone and river restoration plan.

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**CLEAN WATER ACT
Evaluation of Section 404(b)(1) Guidelines**

1. Review of Compliance (Section 230.10(a) - (d)).

An evaluation of the Federal action indicated that:

		Yes	No
a.	The discharge represents the least environmentally damaging practicable alternative and if in a special aquatic site, the activity associated with the discharge must have direct access or proximity to, or be located in the aquatic ecosystem to fulfill its basic purpose.	X	
b.	The activity does not appear to:		
	(1) violate applicable state water quality standards or effluent standards prohibited under Section 307 of the CWA	X	
	(2) jeopardize the existence of Federally listed threatened and endangered species or their habitat	X	
	(3) violate requirements of any Federally designated marine sanctuary.		NA
c.	The activity will not cause or contribute to significant degradation of waters of the U.S. including adverse effects on human health, life stages of organisms dependent on the aquatic ecosystem, ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values	X	
d.	Appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem.	X	

2. Technical Evaluation Factors (Subparts C-F).

a. Potential Impacts on Physical and Chemical Characteristics of the Ecosystem (Subpart C)

		N/A	Yes	No
1.	Substrate a. Substrate Elevation and Slope: varies b. Sediment Type: sand/cobble/gravel/river stone c. Fill Material Movement: Sediment redeposition by natural processes. The sediment behind the dam will move quickly downstream when water levels begin to reach their lowest levels and will deposit in undercut and eroded sections of riverbank. d. Physical Effects on Benthos: Temporary, minor effect on flow and patterns during the final release as any sediment transported downstream settles. It is expected that benthos will quickly recolonize the area in a short period of time.		X	
2.	Suspended particles/turbidity. a. Expected changes in suspended particulates and turbidity levels in vicinity of fill site: Temporary, observable effect during the final stages of water drawdown. The area should reach a stabilized equilibrium in a relatively short time period. b. Effects on Chemical and Physical Properties of the Water Column: Temperature: Positive effect after dam removal. Area of impoundment will be a free flowing stream with cooler water temperatures.		X	
3.	Water column impacts. a. Light Penetration: Temporary effect, during last stages of water leaving the reservoir. b. Dissolved Oxygen: Temporary, minor effect. c. Toxic Metals and Organics: No effect. d. Pathogens: No effect e. Aesthetics: Temporary, minor effects that will occur at the dewatering period. The empty reservoir basin will be affected until the revegetation period. Site should stabilize quickly and planting plan is in place for any exposed riverbanks due to the dam removal.		X	

	4.	Current patterns and water circulation. - minor effect on flow and patterns during the final release.		X	
	5.	Normal water fluctuations.			X
	6.	Salinity gradients.	X		

b. Potential Impacts on Biological Characteristics of the Aquatic Ecosystem (Subpart D).

			N/A	Not Significant	Significant
	1.	Threatened and endangered species.		X	
	2.	Fish, crustaceans, mollusks, and other organisms in the aquatic food web.		X	
	3.	Other wildlife (mammals, birds, reptiles, and amphibians).		X	

c. Potential Impacts on Special Aquatic Sites (Subpart E)

			N/A	Not Significant	Significant
	1.	Sanctuaries and refuges.	X		
	2.	Wetlands		X	
	3.	Mud flats	X		
	4.	Vegetated shallows - Temporary, minor. Vegetated shallows are limited within the 8-acre lake. Vegetated shallows within the impoundment will likely re-establish at a lower elevation along the riverbank once the water is removed from behind the dam, and is expected to recolonize along the riverbank shoreline after a short period of time.		X	
	5.	Coral reefs	X		
	6.	Riffle and pool complexes		X	

d. Potential Effects on Human Use Characteristics (Subpart F)

			N/A	Not Significant	Significant
	1.	Municipal and private water supplies	X		
	2.	Recreational and commercial fisheries. - Temporary, minor effect during dewatering		X	
	3.	Water-related recreation. - Positive effect		X	
	4.	Aesthetic impacts. - Temporary, minor effect. Positive effect.		X	
	5.	Parks, national and historic monuments, national seashores, wilderness areas, research sites and similar preserves. - Temporary, minor effect		X	

Remarks:

2.a.1-4. See Environmental Assessment. Temporary impacts to riverbed from downstream sediment migration may be realized with the de-watering of the reservoir. Between 3,000 to 5,000 cubic yards of accumulated stream sediment could be transported to downstream locations. Stored sediment passing through the dam consists of material already existing within the waterbody and does not represent new material being placed into wetlands or waterbodies of the United States. Impacts from the downstream distribution of this material expected to be minor, temporary, and recover quickly as natural events re-distribute the material within the stream bed. Increases in suspended particles and turbidity are expected to be relatively high as the bulk of

sediment begins to pass through the dam and enters the water column during naturally turbid conditions; however increases are expected to be relatively high only for short periods and short distances downstream, settling out quickly. The impacts would be minimal and short term. Impacts to current patterns and water circulation would be realized as the material re-contours current sediment starved sections of the waterbody. These impacts are expected to be temporary and short-lived. The loss of environmental characteristics and values is not considered significant and the material is expected to be beneficial to in-stream habitats. The impact for sediment passes through the dam could temporarily degrade aquatic habitats from deposition; however, release during a high storm event is expected to redistribute material to undercut banks and result in no long-term adverse impacts. Mitigation measures are to be implemented to ensure, to the extent practical, aquatic based resource impacts are below significant levels.

3. Evaluation and Testing (Subpart G).

a. The following information has been considered in evaluating the biological availability of possible contaminants in dredged or fill material. (Check only those appropriate.)

		N/A	Not Significant	Significant
1.	Physical characteristics -fines, sand, gravel		X	
2.	Hydrology in relation to known or anticipated sources of contaminants.		X	
3.	Results from previous testing of the material similar material in the vicinity of the project.		X	
4.	Known, significant sources of persistent pesticides from land runoff or percolation.		X	
5.	Spill records for petroleum products or designated hazardous substances (Section 311 of CWA).	X		
6.	Spill records of significant introduction of contaminants from industries, municipalities, or other sources.		X	
7.	Known existence of substantial material deposits of substances that could be released in harmful quantities to the aquatic environment.	X		
8.	Other sources (specify)	X		

List appropriate references:
See Environmental Assessment, Section 3.8 . The impaired status of the lake is from non-source point pollution. USACE chemical and physical sediment sampling (April 2014) was completed to provide general data on concentrations of contaminants, if present, that could potentially be transported downstream. The results were compared with CT-ICS, Industrial/Commercial Direct Exposure Criteria for Soil Criteria per Amended Remediation Standard Regulations - effective June 27, 2013, and CT-RC, Residential Direct Exposure Criteria for Soil Criteria per Amended Remediation Standard Regulations - effective June 27, 2013.

b. An evaluation of the appropriate information in 3a above indicates that there is reason to believe the proposed dredge or fill material is not a carrier of contaminants, or that levels of contaminants are substantively similar at extraction and disposal sites and not likely to require constraints. The material meets the testing exclusion criteria.

		X	
		Yes	No

4. Disposal Site Delineation (Section 230.11(f))

a. The following factors, as appropriate, have been considered in evaluating the disposal site.

		N/A	Not Significant	Significant
1.	Depth of water at disposal site - Varies. Riverine habitat		X	
2.	Current velocity, direction, and variability at disposal site		X	
3.	Degree of turbulence		X	
4.	Water column stratification		X	
5.	Discharge vessel speed and direction	X		
6.	Rate of discharge		X	
7.	Dredged material characteristics (constituents, amount, and type of material, settling velocities)		X	
8.	Number of discharges per unit of time	X		
9.	Other factors affecting rates and patterns of mixing (specify)	X		

List appropriate references:

See Environmental Assessment. Sediment volumes from discharge are expected to be within the seasonal variability of the amount of sediment and water carried by the Northfield Brook watershed over an annual cycle. Sediment dissemination from material existing behind the dam could range from 3,000 to 5,000 cubic yards and is expected to distribute in accordance with water velocities of the course of a normal flood and non-flood season.

b. An evaluation of the appropriate factors in 4a above indicated that our disposal sites and/or size of mixing zone are acceptable.

		X	
		Yes	No

5. Actions To Minimize Adverse Effects (Subpart H)

All appropriate and practicable steps have been taken, through application of recommendation of Section 230.70-230.77 to ensure minimal adverse effects of the proposed discharge.

		X	
		Yes	No

List Actions Taken:

See Environmental Assessment, Section 3.15, Mitigation Measures. The release of water and downstream sediment transport will occur in conjunction with a high rain event and the water from the dam as quickly as possible, consistent with the Outflow Guidance. High water flow dam operations allow sediment-laden waters to flow from or through a dam; however the action to dewater the entire lake deviates from normal flood control dam operations that may see the discharge of bottom sediment to downstream locations.

6. Factual Determination (Section 230.11)

All review of appropriate information, as identified in items 2 through 5 above, indicate there is minimal potential for short or long-term environmental effects of the proposed discharge as related to:

		Yes	No
a.	Physical substrate at the disposal site (review sections 2a, 3,4, and 5 above substrate elevation and slope: instream transport sediment type: fines, sand, gravel fill material movement: with stream velocity physical effects on benthos: Temporary, minor	X	

