

FINAL RESTORATION PLAN AND ENVIRONMENTAL ASSESSMENT ADDENDUM

**COMBE FILL SOUTH LANDFILL SUPERFUND SITE
MORRIS COUNTY, NEW JERSEY**

December 2017 Addendum Revised from
June 2016 Final Restoration Plan and Environmental Assessment

Prepared by:
United States Fish and Wildlife Service
on behalf of the U.S Department of the Interior, and
the New Jersey Department of Environmental Protection
on behalf of the State of New Jersey

Contact: Cathy Marion
U.S. Fish and Wildlife Service
4 East Jimmie Leeds Road
Galloway, New Jersey 08205
Cathy_Marion@fws.gov

A. INTRODUCTION

This Addendum (Addendum) summarizes two specific restoration projects identified under Selected Alternative Two of the “Final Restoration Plan and Environmental Assessment for the Combe Fill South Landfill Superfund Site”, issued in June 2016 (Final RP/EA). This Addendum to the Final RP/EA has been prepared by the U.S. Fish and Wildlife Service (Service) acting as the Natural Resource Trustee on behalf of the Department of the Interior (DOI), and the New Jersey Department of Environmental Protection (NJDEP) as the Natural Resource Trustee on behalf of the State of New Jersey (NJ) (collectively referred to as Trustees).

B. BACKGROUND

The Final RP/EA described the hazardous substance release at the Combe Fill South Superfund Site (Site), and summarized the natural resources injured due to the release of hazardous substances at the Site. The Final RP/EA selected two restoration alternatives that work to restore, rehabilitate, replace, or protect the same types of natural resources that have been injured or lost by hazardous substance releases associated with the Site.

The first selected alternative (*Selected Alternative 1*) for restoration implementation was the removal of the Hughesville Dam, located on the Musconetcong River, in Warren and Hunterdon counties, New Jersey. The Hughesville Dam was successfully removed in September 2016. By the spring of 2017, American shad were observed spawning in the Musconetcong River for the first time in over 100 years, a testament to the underlying need for and success of this project. American shad were observed spawning as far upstream as the next mainstem barrier, the Warren Glen Dam.

The second selected alternative (*Selected Alternative 2*) for restoration implementation was general aquatic restoration projects and/or monitoring programs located in the Upper Delaware Watershed that are designed to reestablish the general structure, function, and self-sustaining behavior of aquatic systems that have been degraded, with the intention of restoring natural resources similar to those injured at the Site. The Final RP/EA did not identify specific projects for implementation under *Selected Alternative 2*, but reserved the right for the Trustees to identify such projects through an addendum to that document at a future date. The purpose of this Addendum is to identify and describe specific projects under *Selected Alternative 2* that meet the restoration criteria set forth in the Final RP/EA.

C. PROPOSED RESTORATION

Under *Selected Alternative 2* of the Final RP/EA, the Trustees reserved the right to identify specific aquatic restoration projects in the Upper Delaware Watershed that would reestablish the general structure, function, and self-sustaining behavior of aquatic systems that have been degraded. Appropriate projects include, but are not limited to: dam removal; instream and floodplain restoration; and/or individual components of aquatic restoration projects (*e.g.*, feasibility studies, sediment analyses, engineering design plans). The following sections describe two restoration projects that the Trustees have identified and selected for implementation under *Selected Alternative 2*.

RESTORATION PROJECT 1 - COLUMBIA AND REMNANT DAM REMOVAL

The first project identified for restoration implementation is the removal of the Remnant and Columbia Dams, located on the Paulins Kill River in Knowlton Township, Warren County, New Jersey. The Paulins Kill River is a 41.6-mile-long tributary to the Delaware River located in the Appalachian Ridge and Valley Province of NJ. Its headwaters originate near Route 622 in Fredon Township, NJ, and the river runs in a southwest direction through Sussex and Warren Counties, joining the Delaware River in Columbia, NJ. The Paulins Kill drains an approximate area of 177 square miles.

The Paulins Kill River includes several dams along its length; the Remnant and Columbia Dams are currently the downstream-most barriers. The Remnant Dam is approximately 20 feet high, partially breached, and located approximately 0.1 mile upstream of the Delaware River confluence. The Columbia Dam is 18 feet high and 330 feet wide, and is situated on the Paulins Kill River at approximately 0.3 mile upstream of the Delaware River confluence.

The Remnant Dam was constructed in 1901 to create an impoundment to harvest ice and generate electric power for nearby towns. A series of extreme weather events repeatedly undermined construction efforts, and the project was ultimately abandoned in 1902. The Remnant Dam has remained partially breached and abandoned to current times. The Columbia Dam was built in 1909, and a small hydropower facility was intermittently operated on the site until 2016. The State of New Jersey is the owner of the Remnant and Columbia Dams, and does not desire to repair, replace, maintain, or reconstruct either structure.

Dam removal and planned aquatic/floodplain restoration activities would improve an impaired aquatic system and provide environmental and recreational benefits including, but not limited to: restoration of historic connectivity between the Paulins Kill and Delaware Rivers; fish passage for resident migratory fishes and other migratory aquatic taxa; access to 11 miles of historic spawning/rearing grounds for imperiled diadromous fish species; restoration of native free-flowing riverine habitat; wetland and floodplain restoration; improved water quality and reduction of algal/weed blooms; reduced localized flooding; increased fishing and paddling recreation; reduced long-term maintenance and liability costs for the dam owner; and the elimination of a public health and recreational safety hazard.

The Columbia Dam negatively affects several diadromous fish species of conservation concern, including the blueback herring (*Alosa aestivalis*), American shad (*Alosa sapidissima*), and American eel (*Anguilla rostrata*). All three species have experienced significant population declines from historic Delaware River basin levels, and those declines can be partially attributed to the loss of riverine spawning and nursery habitats resulting from dam construction. All three species have been documented downstream of the Columbia Dam. American eel have been captured above the dam, but current monitoring efforts suggest that the dam significantly alters the upstream population abundance and size-structure of this species. Dam removal will restore approximately 11 miles of historic spawning and nursery habitat in the mainstem Paulins Kill River, will likely restore historic populations of diadromous species to the Paulins Kill, and will additionally support larger-scale Delaware River diadromous metapopulations.

Dam removal would involve 0.59 acre of permanent instream (open water) disturbance caused by the removal of the Columbia Dam and Remnant Dam structures. Under proposed conditions, dam removal would recreate a river channel analogous to pre-dam conditions, and 44.5 acres of stream and wetland/transitional areas would be actively restored within the former Columbia Lake impoundment.

RESTORATION PROJECT 2 - ACTIVITIES ASSOCIATED WITH THE WARREN GLEN DAM REMOVAL

The second project identified for restoration implementation includes individual components associated with the Warren Glen Dam removal (*e.g.*, feasibility studies, engineering design studies), and/or contribution of funds towards the Warren Glen Dam removal. The Warren Glen Dam is situated on the Musconetcong River approximately 5.6 miles upstream of the Delaware River confluence, located in Pohatcong and Holland Townships, Warren and Hunterdon counties, New Jersey. The Musconetcong River is a 42-mile-long tributary to the Delaware River; its watershed is approximately 160 square miles and it flows through the “New Jersey Highlands” region of Sussex, Morris, Warren, and Hunterdon Counties. More than 30 dams occur along the river, most of which were built for industrial use in the early 1900s. Many of the river’s tributaries are classified as “Category 1”, the highest water quality classification given by the NJDEP. In addition, 24.2 miles of the Musconetcong River are designated by the National Park Service as part of the National Wild and Scenic River System (120 Stat. 3363; 16 U.S.C. 1271 *et seq.*).

The Warren Glen Dam was constructed in 1916 by Riegel Products, Inc. to power a paper mill and generate electricity. The dam is currently part-owned by the NJDEP and part-owned by Warren Glen Investments, LLC/International Paper Product. Both owners are in favor of dam removal. The Warren Glen Dam is a 330-foot-long earth and concrete structure with a maximum height of approximately 37.5 feet. The structure features a sluice gate regulated diversion canal, and a 125-foot-long concrete, ogee-type spillway. The dam is flanked to the east by the Musconetcong Gorge Preserve, managed by the Hunterdon County Division of Parks and Recreation; and to the west by privately-held land.

The NJDEP classifies the Warren Glen Dam as a Class I – High Hazard Potential structure. This classification indicates that dam failure may cause extensive property damage or loss of life (N.J.A.C. 7:20-1.8). A limited engineering assessment conducted in 2012 indicated that the dam was in poor condition, and would require extensive rehabilitation of the existing concrete spillway, training walls, and embankments to meet NJ Dam Safety Standards (N.J.A.C. 7:20).

In addition to significant structural deficiencies and dam safety concerns, the Warren Glen Dam is currently the downstream-most barrier on the Musconetcong River, after the recent removal of three dams further downstream. The Warren Glen Dam is known to block anadromous fish populations; in spring of 2017, American shad were documented spawning below the dam for the first time in over 100 years. This historic milestone in the ecological recovery of the Musconetcong River was achieved through a long-term dam removal partnership of Federal, State, and non-profit entities.

In addition to negatively affecting several diadromous species of concern (*i.e.*, blueback herring, American shad, American eel), the dam also contributes to the overall degradation of water quality in the form of: increased temperatures; decreased dissolved oxygen; excessive nutrients and algae; and sediment retention. The dam also inhibits recreational fishing and boating activities.

The NJDEP is currently conducting a survey of the quality and quantity of sediments retained by the Warren Glen Dam. This is a first step in determining the costs and feasibility of dam removal. Future steps will involve a formal feasibility study, and the generation of engineering design plans. The removal of the Warren Glen Dam would reconnect 8 miles of the Musconetcong River with the Delaware River, greatly benefitting diadromous fish species and other migratory aquatic taxa, as well as improving water quality, improving aquatic recreation, and reducing a significant hazard to nearby properties and human safety.

D. COMPLIANCE WITH THE NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

This Addendum to the Final RP/EA and the attached Environmental Assessment for the Columbia and Remnant Dam Removals ensures that all components of the identified projects under *Selected Alternative 2* are in compliance with NEPA and other applicable Federal statutes, Executive Orders, and policies. Coordination and evaluation of required compliance with additional Federal Acts, Executive Orders, and other policies for the identified restoration actions is achieved, in part, through the coordination of this document with appropriate agencies and the public. Specific project activities implemented as part of the identified Restoration Project 2 of this Addendum the Final RP/EA are subject to future NEPA compliance, if applicable, and all other applicable state and/or Federal laws and policies.

All project sponsors that receive Natural Resource Damage Assessment and Restoration funding will be responsible for obtaining necessary permits and complying with relevant local, state, and Federal laws, policies, and ordinances. Site monies will be used in conjunction with funds from other sources to accomplish the proposed restoration projects.

E. PUBLIC PARTICIPATION

A draft Addendum to the Final RP/EA and a draft Environmental Assessment for the Columbia and Remnant Dam Removals was released on November 1, 2017, and the public was invited to comment on the document until November 30, 2017. The Trustees published a Notice of Availability in the New Jersey Herald and the New Jersey Observer Tribune, and the document was posted online at: www.fws.gov/northeast/njfieldoffice/pdf/CombeFill_DraftAddendum.pdf.

Comments were received from a total of six respondents representing four non-governmental organizations (Appendix 1). All comments received expressed support for both proposed restoration projects, and none of the comments expressed any questions, concerns, or other issues with the proposed projects.

FINAL ENVIRONMENTAL ASSESSMENT

COLUMBIA AND REMNANT DAM REMOVALS
WARREN COUNTY, NEW JERSEY

UNITED STATES FISH AND WILDLIFE SERVICE
NEW JERSEY FIELD OFFICE

DECEMBER 2017



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1.0 PURPOSE OF THE PROPOSED ACTION

The purpose of the proposed project is to restore the lower Paulins Kill River in the vicinity of the Columbia and Remnant Dams, located in Knowlton Township, Warren County, New Jersey (NJ). The specific proposed restoration actions are the removal of the Remnant Dam, the removal of the Columbia Dam and powerhouse, and active restoration of the river channel and floodplain of the 44.5-acre impoundment upstream of the Columbia Dam (Columbia Lake). The proposed restoration actions would improve an impaired aquatic system and provide environmental and recreational benefits including, but not limited to: restoration of historic connectivity between the Paulins Kill and Delaware Rivers; fish passage for resident migratory fishes and other migratory aquatic taxa; access to 11 miles of historic spawning/rearing grounds for imperiled diadromous fish species; restoration of native free-flowing riverine habitat; wetland and floodplain restoration; improved water quality and reduction of algal/weed blooms; reduced localized flooding; increased fishing and paddling recreation; reduced long-term maintenance and liability costs for the dam owner; and the elimination of a public health and recreational safety hazard.

2.0 NEED FOR PROPOSED ACTION

The Paulins Kill River is a 41.6-mile-long tributary to the Delaware River located in the Appalachian Ridge and Valley Province of NJ. Its headwaters originate near Route 622 in Fredon Township, NJ, and the river runs in a southwest direction through Sussex and Warren counties, joining the Delaware River in Columbia, NJ. The Paulins Kill drains an approximate area of 177 square miles, and is joined along its course by Trout Brook, Keen's Mill Brook, Blair Creek, Jacksonburg Creek, Susquehanna Creek, Dilts Creek, Walnut Creek, and Yards Creek.

The Paulins Kill River includes several dams along its length; the Remnant and Columbia Dams are currently the downstream-most barriers. The Remnant Dam is approximately 20 feet high, partially breached, and located approximately 0.1 mile upstream of the Delaware River confluence. The Columbia Dam is 18 feet high and 330 feet wide, and is situated on the Paulins Kill River at approximately 0.3 mile upstream of the Delaware River confluence. The Columbia Dam creates a 44.5-acre impoundment (Columbia Lake) that extends approximately 1 mile upstream of the dam, although the total backwater influence of the dam extends to approximately 1.5 miles upstream. The next intact upstream barrier is the Paulina Dam, located approximately 11 miles upstream of the Delaware River confluence.

The Remnant Dam was constructed in 1901 to create an impoundment to harvest ice and generate electric power for nearby towns. A series of extreme weather events repeatedly undermined construction efforts, and the project was ultimately abandoned in 1902. The dam has remained partially breached and abandoned to current times.

Construction of the Columbia Dam began in 1909 by the Warren County Power Company (Hunter Research, Inc. 2016). The structure is a Ransom-type, buttressed, hollow, reinforced-concrete dam, adjacent to a reinforced-concrete powerhouse. Upon completion in 1910, ownership was transferred to the Eastern Pennsylvania Power Company. Later, in 1918, ownership was transferred to the New Jersey Power and Light Company who produced

electricity for local residents until approximately 1955, when the facility was sold to the State of New Jersey. The facility subsequently fell into disrepair, and in 1979, the U.S. Army Corps of Engineers declared the dam in “poor overall condition” (U.S. Army Corps of Engineers 1979). In 1984, the Great Bear Hydroelectric Company leased the facility from the State and took efforts to restore the existing facilities to accommodate new turbines, generators, and automatic control equipment. The Federal Energy Regulatory Commission (FERC) license for the facility was scheduled for renewal in 2025; as part of the renewal process, the company was required to implement significant upgrades, structural improvements, and fish passage accommodations. In lieu of renewal, FERC issued an Order Accepting License Surrender from the Great Bear Hydroelectric company on August 10, 2016. As the owner of the Columbia and Remnant Dams, the State of New Jersey does not desire to repair, replace, maintain, or reconstruct either structure.

Several key issues contribute to the need for the removal of the Columbia and Remnant Dams. These needs include those associated with: a) the negative effect of the dams on aquatic habitat connectivity and fish populations; b) the negative effect of the dams on water quality; c) the age and existing condition of the dams; and d) the opportunity for beneficial ecological restoration of the Lower Paulins Kill River.

The Columbia Dam, in particular, contributes to several aspects of ecosystem degradation. First, the Columbia Dam fragments aquatic habitats by eliminating connectivity between the Delaware and Paulins Kill River. Aquatic habitat connectivity is extremely important to many resident and migratory fish species that require the use of multiple habitat types throughout the larger Delaware River Basin to complete their life history requirements. Dams are notorious for having deleterious impacts on fish and other aquatic migratory species. For example, diadromous migratory fishes such as American shad, blueback herring, and American eel that spend time at sea, but also require freshwater habitats to spawn and/or grow, have been substantially negatively impacted by Delaware River tributary dams that block their migratory efforts.

Secondly, the Columbia and Remnant Dams degrade water local water quality. Man-made impoundments are not intended to last forever, they typically have a life span that is largely contingent on the rate of natural infilling with sediments from upstream sources. River systems are naturally designed to convey sediments from upstream to downstream reaches; these sediments are ultimately captured in deltas and help to create beneficial wetland areas near the ocean. When rivers are dammed, these sediments are blocked and begin to accumulate in the impoundments behind dams. As a result, impoundments become shallower over time. As impoundments get shallower, they also become warmer. Water temperatures increase due to direct solar radiation from the sun. Impoundments also ‘stratify’, meaning that colder, denser water settles near the bottom, and warmer, less dense water is near the top. During stratification, the colder, denser water often becomes anoxic, meaning that aquatic biota cannot survive at depth in the absence of oxygen and are therefore constrained to the warmer waters of the surface which are unsuitable for many species. Dams also trap nutrients, such as nitrogen and phosphorus, which are derived from plants and leaves that fall in upstream waters and are transported downstream. Too many nutrients can cause negative impacts, such as algal blooms and excessive weed growth; both of which are commonly observed at Columbia Lake.

Third, dams age and become obsolete over time. The Remnant Dam failed over 100 years ago, and has never served any purpose beyond diverting river flow and causing erosional issues. The Columbia Dam will soon be 110 years old. The original function of the dam is obsolete; it is no longer used to produce electricity through hydropower. The spillway and powerhouse are ageing and will continue to deteriorate over time. The costs for repairs and maintenance will be realized into the indefinite future and will continue to increase as the dam gets older. These costs would be indirectly incurred by NJ taxpayers.

The removal of the Columbia and Remnant Dams would reconnect approximately 11 miles of the mainstem Paulins Kill and an additional 20 miles of tributary streams to the Delaware River. Diadromous species that would benefit from the proposed project include American eel, American shad, and blueback herring. In addition to fish passage, dam removal and planned aquatic/floodplain restoration activities would provide environmental and recreational benefits including, but not limited to: restoration of historic connectivity between the Paulins Kill and Delaware Rivers; fish passage for resident migratory fishes and other migratory aquatic taxa; reconnection and restoration of riverine habitat; wetland and floodplain restoration; improved water quality (*e.g.*, reduced summer temperatures, increased dissolved oxygen); reduced localized flooding; increased fish and paddling recreation; and the elimination of a public health and recreational safety hazard.

3.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The following alternatives are evaluated in this Environmental Assessment (EA).

3.1 ALTERNATIVE A – NO ACTION

The No Action Alternative sets a baseline of existing conditions continued into the future against which to compare impacts of restoration action alternatives. This is important contextual information in determining the relative magnitude and intensity of proposed impacts. Under the No Action Alternative, no efforts would be taken to restore or rehabilitate the lower Paulins Kill River. There would be no action to remove the Columbia or Remnant Dams; no effort to provide fish passage for imperiled anadromous fishes, no effort to provide historical connectivity with the Delaware River to benefit resident fishes and other aquatic biota; no effort to improve water quality, no effort to improve water-based recreation; and no effort to ameliorate a looming public health and recreational safety hazard. The Columbia and Remnant Dams would be maintained by the owner, as required by law, but would continue to age and deteriorate, with maintenance and upkeep costs persisting into the indefinite future.

3.2 ALTERNATIVE B – DAM REMOVAL

The proposed action includes the removal of the Remnant Dam, the removal of the Columbia Dam and powerhouse, and the restoration of 44.5 acres of the Columbia impoundment. The Remnant Dam would be removed first. The structure would be removed to a distance of 10 feet from the existing bank, and to a minimum depth of three feet below the adjacent river bed. The Columbia Dam removal would begin with an initial dewatering period accomplished by opening the powerhouse turbine conduits. The maximum daily water release would be limited to no more than a one foot drop in surface elevation. Further dewatering would be accomplished by dam

notching and installation of a bypass channel. Once water levels meet the elevation of the downstream concrete apron, the apron would be further saw cut and/or hammered to allow the water surface to be further lowered. Rip-rap would be added as necessary to stabilize exposed subgrades below the concrete apron and dam foundation. Finally the remainder of the dam would be demolished, and the powerhouse would be removed.

As the water level decreases, a channel would begin to form through the former impoundment. It is anticipated that channel formation will occur in approximately the same location as the current thalweg. Active restoration of the channel and floodplain would be accomplished through channel excavation (as necessary), and the formation of floodplain benches that transition from low floodplain, high floodplain, and potentially to upland. Scour protection measures would be implemented at the Interstate 80 (I-80) overpass, the Warrington Road bridge, and the Brugler Road bridge (Figure 1). Fish passage structures, including weirs, would be installed at and around the I-80 overpass.

The proposed dam removals would result in the passive/controlled release of approximately 50,000 cubic yards of sediment. Sediment would be mobilized slowly, and the new channel would self-adjust to an overall stream width of approximately 50 feet and a depth of 2-3 feet during baseflow conditions. An additional 19,454 cubic yards of sediment would be actively managed in the vicinity of the dam and at bridge locations.

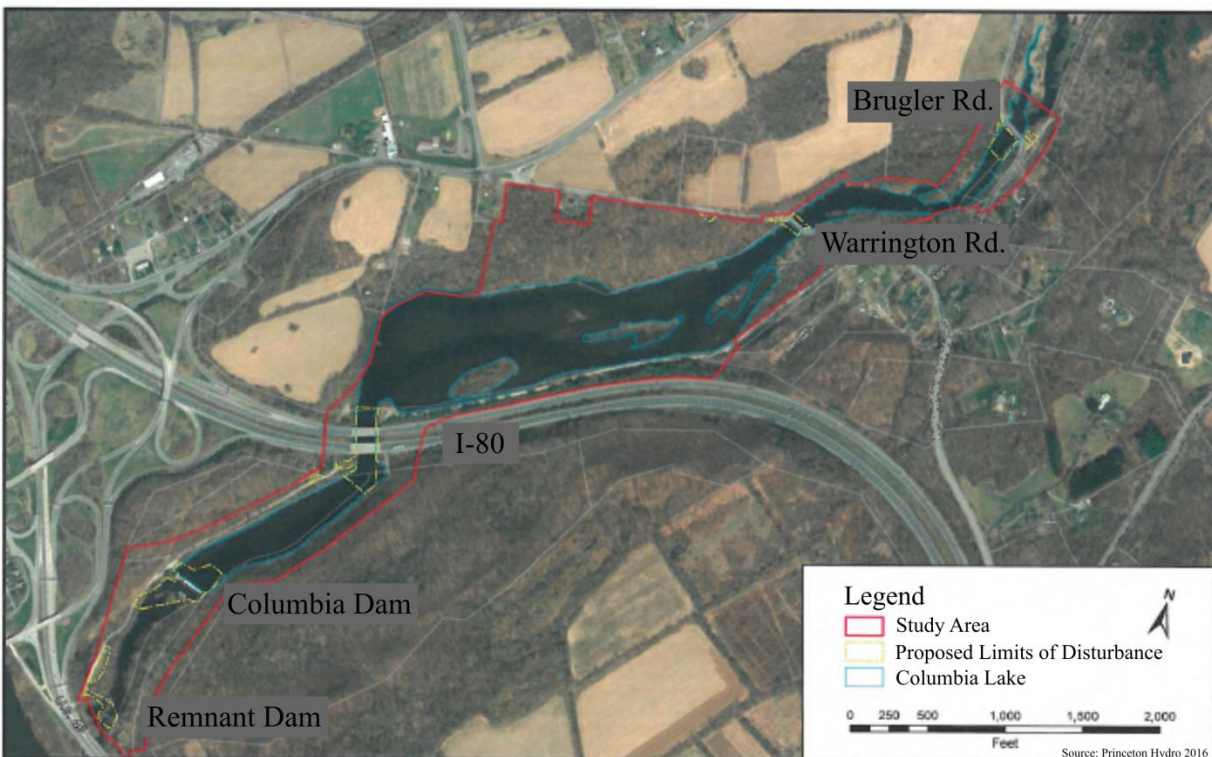


Figure 1. Aerial photo of proposed project area showing Columbia and Remnant Dams, Columbia Lake, road crossings, and proposed limits of disturbance.

3.3 OTHER ALTERNATIVES CONSIDERED

An alternative that was eliminated from consideration was the installation of a fish ladder at the Columbia Dam. Fish passage efficiency studies have shown that fishways are largely ineffective at passing fish on large Atlantic Coast rivers, and the most effective method to restore diadromous fish species is to remove dams (Brown *et al.* 2013). American shad and blueback herring show schooling behavior during spawning, and frequently attempt to pass upstream in groups. This schooling behavior, coupled with their relatively large body size and their inability to jump and leap significantly limits upstream passage even in state-of-the-art fishways (Pess *et al.* 2014). Several studies have indicated that American eel will not use conventional fishways, and require specialized structures, such as those required to pass elvers (Gephard and McMenemy 2004). Fish ladders do not provide passage for mussels and other macroinvertebrate species, whose populations are critical to river health. Fish ladders do not restore essential river functions such as sediment transport; nutrient processing; flow quantity, timing, and variability; thermal and chemical regimes; physical habitat; and benthic substrate. In addition, this alternative would not eliminate the financial responsibility of the dam owner for operation, maintenance, and liability associated with the existing dams and ancillary structures. Increased costs would continue into the future, as the typical life expectancy for most fish ladders is 20-50 years, at which time they will need to undergo expensive repairs or replacement. The fish ladder alternative was eliminated from further consideration because it does not meet aquatic restoration goals, does not ameliorate public safety concerns, and involves a long-term financial commitment from the dam owner.

4.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section describes the baseline environmental conditions potentially affected by the proposed removal of the Columbia and Remnant Dams, and an assessment of the impacts of the proposed project on environmental resources identified.

4.1 WATER RESOURCES

4.1.1 WATER QUALITY

4.1.1.1 AFFECTED ENVIRONMENT

The potentially affected aquatic environment includes the lentic (still water) environment of the 44.5-acre impounded area upstream of the Columbia Dam (Columbia Lake), the lotic (flowing water) section extending approximately 3,000 feet upstream of Columbia Lake (*i.e.*, Warrington Road bridge to just above Brugler Road bridge), and the lotic section downstream of the Columbia Dam extending to the Delaware River confluence (Figure 1).

Section 303(d) of the Clean Water Act (CWA; 33 U.S.C. 1251 *et seq.*, as amended) requires that states conduct a water quality assessment of all state waters, and develop a list of the streams and lakes that do not meet applicable standards or support designated uses. The portion of the Paulins Kill River within the proposed project area was listed by the New Jersey Department of Environmental Protection (NJDEP) in its 2014 303(d) report as not supporting aquatic life –

general; not supporting aquatic life – trout; and not supporting fish consumption (NJDEP 2014). Sources causing impairment include: water temperature; PCB in fish tissue (unknown legacy source); and mercury in fish tissue (atmospheric deposition source). Columbia Lake contributes to elevated summer water temperatures, due to direct insolation, that are exported to downstream reaches. The lake is known to stratify in summer months, creating anoxic zones at various depths. Excessive weed and algal blooms are common. The 2017 NJDEP fish consumption advisory for Columbia Lake limits consumption of largemouth bass, striped bass, and walleye to one meal per week for the general population, and American eel to one meal per month for the general population (NJDEP 2017).

New Jersey Surface Water Quality Standards (SWQS; N.J.A.C 7:9B) establish designated uses, classify streams based on uses, designate antidegradation categories, and develop water quality criteria to protect those uses. These standards are developed and administered in conformance with requirements with the CWA and a Federal regulatory program established by the U.S. Environmental Protection Agency (EPA; 40 C.F.R. Part 131), and were developed pursuant to the New Jersey Water Quality Planning Act (N.J.S.A. 58:11A *et seq.*) and the New Jersey Water Pollution Control Act (N.J.S.A. 58:10A *et seq.*). The portion of the Paulins Kill River within the vicinity of the proposed project has a Freshwater-Trout Maintenance (FW2-TM) designated use classification, and a Category 2 (C2) antidegradation designation.

4.1.1.2 ENVIRONMENTAL CONSEQUENCES

ALTERNATIVE A – NO ACTION

Under Alternative A, water quality conditions in the lower Paulins Kill River would continue to degrade over time. Columbia Lake would become increasingly shallow due to natural sediment transport from upstream reaches that accumulates behind the dam. As the water becomes increasingly shallow, exposed sandbars would continue to develop and become larger, and aquatic vegetation cover and algal blooms will continue to increase. Cumulatively these factors would further degrade water quality by exacerbating high summer water temperatures, trapping nutrients, creating anoxic zones in stratified waters, and providing a sediment template conducive to contaminant build-up.

ALTERNATIVE B – DAM REMOVAL

Removal of the Columbia and Remnant Dams would restore the lower Paulins Kill River to free-flowing riverine conditions. Water lowering and dam removal activities would temporarily increase instream suspended sediment (*i.e.*, turbidity). Increased suspended sediment can affect human recreational use and visual aesthetics, as well as affect aquatic life by interfering with site-feeding, impairing gills, and smothering. Temporary sediment management measures implemented under this alternative would include: a) daily monitoring of suspended sediment at locations above and below the dam removal locations; and b) specific mitigation actions if suspended sediment is above an established threshold level. As a NJ FW2-TM stream, the New Jersey SWQS for turbidity is: a maximum of 50 Nephelometric Turbidity Units (NTU) at any time; and/or a maximum 30-day average of 15 NTU. Previous research has demonstrated that dam removal activities commonly increase downstream turbidity by an order of magnitude

greater than state standards, but that this type of turbidity increase is generally within the range observed during large storm events (Tullos *et al.* 2016). As such, the threshold for mitigation actions for this project is set at an exceedance of either: a) a daily maximum value of greater than 500 NTU (*i.e.*, Downstream NTU – Upstream NTU > 500 NTU); and/or b) a 30-day average greater than 150 NTU (*i.e.*, Average Downstream NTU – Average Upstream NTU > 150 NTU). Mitigation actions would include, but are not limited to: slowing water drawdown; temporary cessation of construction activities; and inspection/repair of sediment or water controls (Princeton Hydro 2016).

Despite short-term impacts, dam removal would result in long-term benefits to water quality. Dam removal would result in the elimination of an impoundment, and the restoration of a single-channel free-flowing riverine system. Native plants and trees would be planted in the newly created floodplain, which would include both wetland and upland areas. The combination of flowing water and bank shading would assist in reducing stream temperatures. Restoration of the impoundment would eliminate anoxic reaches; reduce sediment loading; and reduce nutrient retention and the over-abundance of aquatic vegetation and algal blooms. Increases and/or releases of hazardous contaminants are not anticipated with dam removal (*see* sediment quality, section 4.1.3 below). Therefore, dam removal would have a long-term beneficial impact on water quality.

4.1.2 GROUNDWATER

4.1.2.1 AFFECTED ENVIRONMENT

A review of the NDEP GIS database for locations of public community water supply wells in the vicinity of the project indicated that no public water supply intakes are located within 0.25 mile of the proposed project area (Princeton Hydro 2016).

4.1.2.2 ENVIRONMENTAL CONSEQUENCES

ALTERNATIVE A – NO ACTION

Under Alternative A, groundwater would not be affected.

ALTERNATIVE B – DAM REMOVAL

Under Alternative B, it is possible that small localized changes in the water table may occur. However, a review of public water supply wells indicates that there are no wells in the immediate vicinity of the project area, and therefore any changes to the water table that result from dam removal are unlikely to impact the public water supply.

4.1.3 SEDIMENTS

4.1.3.1 AFFECTED ENVIRONMENT

Sediment Physical Characteristics

Geotechnical mechanical sediment borings indicate that Columbia Lake is comprised of an organic silt surface stratum which varies in thickness but becomes generally thicker with lateral distance from the thalweg of the main channel (Figure 2; Princeton Hydro 2016). This organic silt stratum is underlain by three additional strata consisting of: impounded silt to sandy silt; a native silty sand to silty sand with gravel; and a native poorly graded gravel with sand. The different strata occur at varying depths throughout the impoundment. Native strata likely pre-date the construction of the Columbia Dam, whereas the top two strata are likely a result of impounded flow.

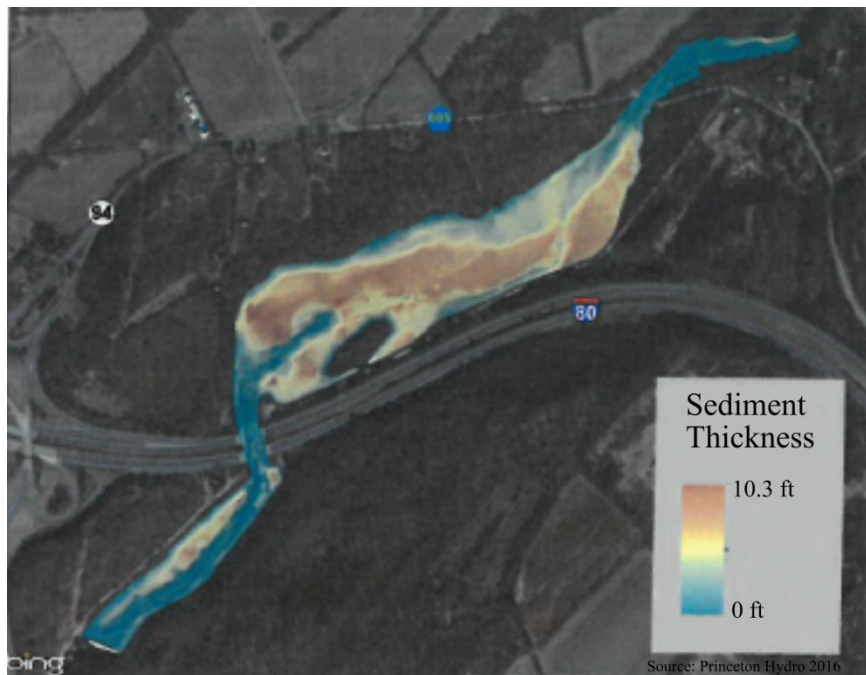


Figure 2. Estimated sediment thickness in the proposed project area.

Mechanical borings in the lower impoundment thalweg (downstream of I-80) show depths of nearly the same height as the dam (approximately 17 feet), indicating that the thalweg sediment in this area is self-scouring due to constricted channel flow. The channel margins of the lower impoundment indicate shallower depths and multiple feet of organic silt deposition. Likewise, the impounded area beneath and just upstream of I-80 is characterized by a negligible amount of impounded sediment, an approximate water depth of eight feet, and underlain by two feet of poorly graded gravel before hitting refusal. The impounded area upstream of I-80 bifurcates to two channels, with the majority of flow in the southern channel. The bifurcated channel re-joins to a single channel at approximately 975 feet downstream of the Warrington Road bridge crossing. Impounded sediments in the primary impoundment (upstream of I-80) are deeper, with up to 7 feet of unconsolidated sediment in the thalweg. Impounded sediments become negligible

upstream of the Warrington Road bridge, and bedrock becomes evident, indicating that this is the likely upstream limit of substantial impounded sediment and potential channel downcutting resulting from dam removal.

A bathymetric survey indicated that the total volume of impounded sediments in Columbia Lake is approximately 306,663 cubic yards (Princeton Hydro 2016). Approximately 25,616 cubic yards of sediment are located between the dam and the I-80 crossing.

The downstream reach extends approximately 1,500 feet, ranging from the Columbia Dam to the confluence with the Delaware River, and is characterized by low-gradient reaches with regular pool-riffle complexes and negligible sediment accretion. The downstream reach appears both laterally and vertically stable. The Remnant Dam, however, is a source of past channel instability, as the channel abruptly meanders around it.

Sediment Quality

Princeton Hydro collected ten inundated sediment cores within Columbia Lake in October 2015 (Figure 3; Princeton Hydro 2016). Samples were collected in accordance with ASTM D1586, and protocols outlined in the NJDEP Field Sampling Procedures Manual (2005; with updates through April 2011). Sampled areas included locations in the impoundment expected to freely discharge downstream during dam removal. All samples were analyzed for Total Organic Carbon (TOC), pH, total suspended solids (TSS), and bulk sediment chemistry (polychlorinated biphenyls (PCBs), pesticides, Target Analyte List (TAL) metals, and semi-volatile organic compounds (SVOCs)); four composite samples were analyzed in accordance to the Standard Elutriate Test. Elutriate tests simulate conditions that result in chemical dissolution of sediment when benthic material is dredged, transported, and deposited at in-water disposal. Results were compared to applicable NJDEP Ecological Screening Criteria (bulk sediment chemistry; NJDEP 2009) and NJDEP Surface Water Quality Standards (elutriate; N.J.A.C. 7:9B).

Results indicated that all bulk chemistry contaminants analyzed (PCBs, pesticides, TAL metals, SVOCs) were below the NJDEP Freshwater Sediment Ecological Screening Criteria Severe Effects Level (SEL). Eight PCB Aroclors were analyzed, but not detected in any boring locations. Pesticides were detected in two boring locations (B-1/B-1A, B-2/B-2A; Figure 3), but were at concentrations below the NJDEP Freshwater Sediment Ecological Screening Criteria Lowest Effects Level (LEL). Metals were found to exceed the LEL in a total of six boring locations: arsenic (2 boring locations); cadmium (1 boring location); copper (5 boring locations); lead (1 boring location); manganese (2 boring locations); nickel (4 boring locations); silver (4 boring locations); zinc (1 boring location). The majority of metal LEL exceedances were found in sediment samples located between the Columbia Dam and the I-80 bridge (boring locations B-1/B-1A and B-2/B-2A; Figure 3). SVOCs were found to exceed the LEL in a total of two boring locations: acenaphthylene, anthracene, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, fluoranthene, phenanthrene (1 boring location); chrysene, pyrene (2 boring locations). The majority of SVOC LEL exceedances were found in sediment samples located in the upper impoundment near the Warrington Road bridge (boring location B-8A; Figure 3). Likewise, in comparing elutriate test

results to NJDEP Surface Water Quality Standards, few concentrations exceeded chronic or acute criteria.

Two bioassay tests were conducted in May 2016 on sediment collected within the impoundment just upstream of the Columbia Dam (Site B-2A; Figure 3) to determine if mobilization of sediment caused by dam removal has the potential to impact fish (Princeton Hydro 2016). Tests included a Suspended Particulate Phase Freshwater Chronic Toxicity Test (7-day *Pimephales promelas*), and a Chronic Solid Phase sediment toxicity test (*Hyalella azteca* 28-day exposure). Bioassay results were compared to those of a downstream control (Paulins Kill River downstream of Columbia Dam), and a nearby reservoir control (Spruce Run Reservoir) to determine if contaminants released from Site B-2A during dam removal pose an ecological risk to fish. Results of these tests indicated that contaminants present just upstream of Columbia Dam (Site B-2A) do not pose a toxicity risk to the local fishery.

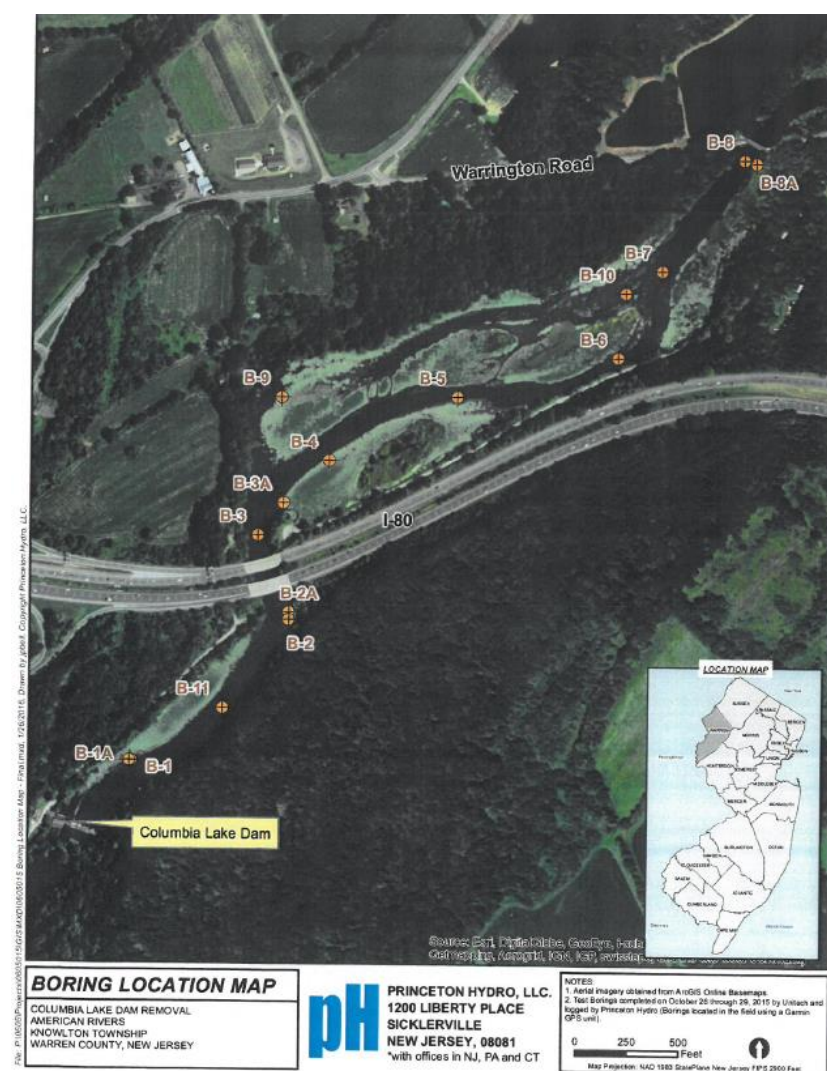


Figure 3. Sediment sample (boring) location map.

4.1.3.2 ENVIRONMENTAL CONSEQUENCES

ALTERNATIVE A – NO ACTION

Under Alternative A, the Columbia Dam would continue to impede sediment transport in the lower Paulins Kill River. The Columbia impoundment would become increasingly shallow over time due to natural sediment transport from upstream reaches that will accumulate in the 44.5-acre impoundment upstream of the dam. Future sediment accretion would negatively impact water quality, and increase the potential risk of contaminant build-up in Columbia Lake.

ALTERNATIVE B – DAM REMOVAL

Sediment Physical Characteristics

The removal of the Columbia and Remnant Dams would result in the passive and/or controlled release of approximately 50,000 cubic yards of sediment from the Columbia impoundment. The contractor would employ a dual sediment management approach, where some sediment is allowed to transport passively, and a portion of the sediment prone to mobilization would be actively managed on-site to limit downstream transport.

Lower impoundment sediments (below I-80) would be released passively. Upper impoundment sediments (upstream of I-80) would be actively managed through: 1) a protracted impoundment drawdown; 2) the installation of a temporary rock coffer; 3) excavation of sediment adjacent to the primary channel; 4) bank toe stabilization; and 5) the creation of floodplain benches adjacent to the channel.

Current plans include an extended impoundment drawdown period of approximately 30 to 60 days which would ensure that the impounded sediment can mobilize slowly as it moves through a newly formed thalweg. The thalweg is predicted to self-adjust to an overall stream width of approximately 50 feet and a depth of 2-5 feet during baseflow conditions. The protracted drawdown period would allow for sediment to dewater slowly, and to stabilize and consolidate under new hydraulic conditions until an initial vegetative cover is established along exposed, dewatered areas.

The initial impoundment drawdown would be accomplished using the existing turbine conduits in the powerhouse, which will allow for manual control of the drawdown rate. The drawdown rate would not exceed 1 foot per day, as outlined in the NJDEP Dam Safety Standards (N.J.A.C. 7:20). As the water level drops, impounded sediments in the upper impoundment are likely to be mobilized first, and shortly after, lower impoundment sediments will become exposed and/or mobilized. The full drawdown would be achieved with a dam notching and the installation of a temporary bypass channel. The upper limit of erosional downcutting is anticipated at approximately 8,400 feet above the Columbia Dam, however the most substantial quantity of impounded sediment is located downstream of Warrington Road.

Newly exposed sediment would be monitored daily during the drawdown and construction process. Adaptive sediment management measures would be employed if significant erosion is

observed. Adaptive management measures may include: slowing the drawdown rate; shifting sediment away from erosion prone areas; installing a downstream stone hook sediment trap; redirective techniques to alleviate pressure on banks; hand broadcasting native seed; hydroseeding; installation of bank erosion control fabrics; and planting with live stakes, plugs, or potted plants.

After sufficient time for dewatering and stabilization, the channel would be actively excavated to form benches that transition from the river channel to low floodplain, to high floodplain, and potentially to uplands. Excavated sediment would be redistributed on the floodplain, but not hauled off-site. The contractor would actively restore native plant communities across the newly created floodplain using seed, stakes, shrubs, and trees. Active planting is important for on-site sediment management and accelerates plant community recovery and natural succession toward a mature, self-sustaining floodplain and riparian plant community.

As part of construction, scour protection measures would be implemented at the I-80 overpass and at the Warrington Road and Brugler Road bridges. The scour protection is required at all three bridges to prevent any potential impacts to existing infrastructure after dam removal.

Impounded sediments would temporarily deposit in downstream reaches. During normal flows, pools and low velocity areas would become shallower. Sediment accretion may temporarily expand existing or form new point bars, lateral bars, or mid-channel bars. High flows in the Delaware River, which create backwater flow in the downstream reach of the Paulins Kill, would also induce sediment deposition. However, over time, deposited sediment would be mobilized during high flow storm events, pools would be re-scoured, and depositional areas would recede as sediment transport from the impoundment attenuates. The rate of sediment flushing would be highly dependent on stochastic storm flow events. Sediment impacts to fish, benthic species, and their habitats would be temporary; these communities would rapidly recolonize as sediment moves through the system. No long-term impacts to aquatic biota are anticipated.

The removal of the Columbia and Remnant Dams would have temporary impacts, but over time would restore a more natural sediment transport regime to the lower Paulins Kill River.

Sediment Quality

Small exceedances of metal LEL conditions are common across the northern NJ, and are frequently representative of background conditions. Most reported LEL exceedances represent contaminants that have little to no (or unknown) biological uptake and/or toxicity. Despite an active fish consumption advisory and a 303(d) listing for mercury and PCBs in fish tissue, results of sediment borings within the Columbia impoundment detected no PCBs, and mercury levels were below LEL. It is unlikely that contaminants present in sediment that is mobilized during project activities would result in a significant ecological impact.

4.1.4 FLOODPLAINS

4.1.4.1 AFFECTED ENVIRONMENT

The U.S. Fish and Wildlife Service (Service) is subject to the requirements of Executive Order (EO) 11988, Floodplain Management (May 24, 1977; 42 FR 26951). The objective of EO 11988 is to “avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practical alternative.”

A review of the Federal Emergency Management Agency (FEMA) National Flood Hazard Map (Figure 4) indicates that the proposed project area is located within the 100-year floodplain (also known as the 1% annual chance of flood) of the lower Paulins Kill River. No residential properties are located in this Hazard Zone.

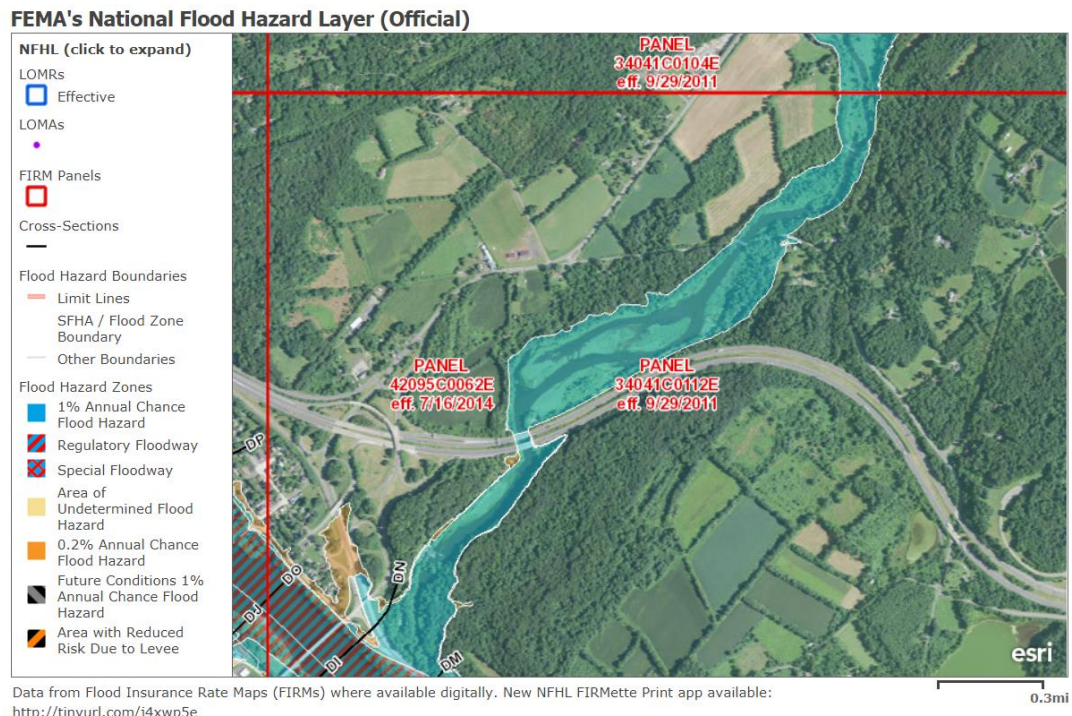


Figure 4. FEMA Flood Hazard Area Map for the proposed project area.

4.1.4.2 ENVIRONMENTAL CONSEQUENCES

ALTERNATIVE A – NO ACTION

Under Alternative A, existing hydraulic conditions evident in the vicinity of the Columbia and Remnant Dams would remain unaltered. Sediment would continue to accumulate in the impounded area upstream of the Columbia Dam, creating increasingly shallow water over time, and thus decreasing the impoundment’s capacity to store water during storm events. As such, localized flooding may increase over time. However, it is unlikely that the boundary of the 100-year floodplain would change substantially from its existing location.

ALTERNATIVE B – DAM REMOVAL

A study of existing and proposed hydraulic conditions was completed to inform the dam removal engineering design and to assess impacts to adjacent infrastructure (Princeton Hydro 2016). The study concluded that dam removal would lead to no adverse impacts to environmental resources, flooding, or regulatory floodplains.

The hydraulic assessment indicated that dam removal would reduce water surface elevations, and in turn, water velocities and sheer stress would increase within the currently impounded area. An evaluation of scour potential on proximate infrastructure within the proposed project reach indicated that given a 500-year flood event, there would be: no scour impact (I-80 bridge); no change in scour (Route 46 bridge); a small increase in scour (Brugler Road bridge); and a small decrease in scour (Warrington Road bridge). Proposed scour counter measures include, but are not limited to, extensions of existing rip-rap, and rock vane structures.

A reduction of surface water elevations and increased velocity in the former impoundment would lead to the creation of a single channel, and would expose currently submerged areas that would be actively restored to wetland and transitional floodplains. This restoration of the 44.5-acre floodplain would allow for greater storage and dissipation of storm flows, which would in turn reduce the risk of localized flood events.

4.2 BIOLOGICAL RESOURCES

4.2.1 FISH

4.2.1.1 AFFECTED ENVIRONMENT

The Remnant Dam is breached, and likely allows most, if not all, fish species to pass freely in both an upstream and downstream direction. In contrast, the Columbia Dam is a complete barrier that blocks the upstream migration of most, if not all fish species. The Columbia Dam has a large uncontrolled spillway, and therefore it is possible that some fish species may passively and/or actively pass in a downstream direction.

Within the project area, the Paulins Kill River hosts a variety of fish species, including many that are targeted for recreational fishing. Table 1 provides a list of species captured in and within the vicinity of the proposed project area during 2015-2016 dam removal monitoring efforts (Shramko, pers. comm. 2017).

Diadromous species known to occur in the Paulins Kill River include American eel, American shad, and blueback herring (Shramko, pers. comm. 2017). Dam removal monitoring efforts (2015-2016) indicate that American eel occur both below and above the Columbia Dam. Preliminary data indicate that the Columbia Dam alters the upstream population abundance and size-structure of this species. American shad and blueback herring have been captured below the Columbia Dam, but are unable to move further upstream due to the complete barrier. Historic American shad populations (*i.e.*, records dated to the 1700s) are known to occur as far upstream as Stillwater Township, NJ (Cummings 1964).

The Delaware River is unique along the Atlantic Coast in that it is free-flowing along the entire length of the mainstem, which allows numerous species of migratory fish to travel far into its headwaters. American shad spawning is thought to primarily occur in the mainstem and tributaries located between Easton, Pennsylvania (River Mile 183) and Hancock, New York (River Mile 330). The Paulins Kill confluence is located at River Mile 207, as such, there is a strong likelihood for its use by spawning shad (Delaware River Basin Fish and Wildlife Management Cooperative 2014).

Table1. Fishes present in the project area. Common game species indicated with an asterisk (*).

<i>Anguillidae</i> American eel	<i>Cyprinidae</i> Satinfin shiner Spotfin shiner Common carp* Cutlip minnow Common shiner Golden shiner Spottail shiner Fathead minnow Blacknose dace Longnose dace Creek chub Fallfish	<i>Esocidae</i> Chain pickerel*
<i>Catostomidae</i> White sucker Northern hogsucker		<i>Ictaluridae</i> Yellow bullhead Brown bullhead* Channel catfish* Margined madtom
<i>Centrarchidae</i> Rock bass Bluespotted sunfish Pumpkinseed* Bluegill* Redbreast sunfish* Smallmouth bass* Largemouth bass* Black crappie*	<i>Cyprinodontidae</i> Banded killifish	<i>Percidae</i> Tessellated darter Yellow perch* Shield darter Walleye*
<i>Clupeidae</i> Blueback herring American shad Gizzard shad		<i>Salmonidae</i> Rainbow trout* Brown trout* <i>Umbridae</i> Eastern mudminnow

4.2.1.2 ENVIRONMENTAL CONSEQUENCES

ALTERNATIVE A – NO ACTION

Under Alternative A, the current status of fishes would continue to exist in the indeterminate short-term. The presence of the Columbia and Remnant Dams would continue to impede fish passage and degrade water quality and aquatic habitats of the lower Paulins Kill River, which may alter the presence, abundance, and distribution of some species.

ALTERNATIVE B – DAM REMOVAL

Long-term beneficial impacts on fish assemblages would be expected from the removal of the Columbia and Remnant Dams. Diadromous and seasonally migratory fishes would greatly benefit from barrier removal and increased mobility and connectivity between the Paulins Kill and Delaware Rivers. Approximately 11 miles of spawning and rearing habitats that have been blocked for over one hundred years would become accessible.

Dam removal would restore the natural flow regime of the lower Paulins Kill River, transforming the former Columbia impoundment to a free-flowing river reach. Dam removal would change local physicochemical conditions that structure the presence and abundance of local fish assemblages. For example, it is anticipated that stream velocities would generally

increase, aquatic habitats would diversify to a more complex series of riffle-pool-run habitats, summer water temperatures would decrease, and dissolved oxygen levels would increase. Such changes in local habitat conditions would lead to changes in fish assemblages. It is probable that there would be a localized decrease in lentic species, and a shift to a lotic assemblage. Dam removal may also reduce habitat conditions favorable to non-native species (*e.g.*, common carp). Anticipated improvements to the complexity and quality of aquatic habitat would also provide direct and indirect long-term benefits to food resources, such as higher productivity and diversity of prey species.

Short-term adverse impacts on fish assemblages would be expected during dam removal activities due to the physical disturbance of aquatic habitats, namely increased suspended and deposited sediment. It is likely that these habitat disturbances would lead to the temporary displacement and disturbance of fish assemblages throughout the proposed project area, but particularly in areas downstream of the Columbia Dam. Due to the proximity of the project area to the mainstem Delaware River, it is anticipated that large flow events would flush impounded sediments through the system relatively quickly, therefore, it is anticipated that adverse impacts to local habitats would be short-term. Displaced and/or impacted fishes are likely to recolonize rapidly from upstream, downstream, and tributary source populations. Sediment mitigation measures such as those described in Section 4.1.3, as well as dam removal scheduling activities to avoid important life history phases of sensitive fish species, would minimize these impacts.

4.2.2 STATE THREATENED AND ENDANGERED SPECIES

4.2.2.1 AFFECTED ENVIRONMENT

Results from a search of the New Jersey Natural Heritage Database (NHP File No. 16-4007581-11121), dated December 28, 2016, indicated that multiple State threatened or endangered species are present at or in the vicinity of the proposed project area (Princeton Hydro 2016). The following species are present in the project area: bald eagle (endangered); osprey (threatened); bobcat (threatened). The following species are present in the vicinity of the project area: vesper sparrow (endangered); barred owl (threatened); northern goshawk (endangered); and timber rattlesnake (endangered).

The portion of the Paulins Kill River downstream of the Columbia Dam was surveyed for mussel species by the U.S. Geological Survey in August 2017. No Federal threatened or endangered species were encountered. However, three State threatened species were found: triangle floater (1 organism); yellow lampmussel (2 organisms); and eastern lampmussel (6 organisms).

4.2.2.2 ENVIRONMENTAL CONSEQUENCES

ALTERNATIVE A – NO ACTION

Under Alternative A, there would be no new impacts to State threatened and endangered species. However, the dams may restrict the current presence, distribution, and abundance of some species, such as State-listed mussels. Aquatic habitats of the lower Paulins Kill would continue

to degrade over time as sediment accumulates in the Columbia impoundment, resulting in reduced foraging habitat suitability for some species (e.g., bald eagle, osprey).

ALTERNATIVE B – DAM REMOVAL

It is unlikely that any of the State endangered or threatened bird species identified above would be substantially impacted by the proposed project. Bald eagle and osprey may use the Columbia impoundment for foraging, but there are abundant foraging opportunities available in the nearby Delaware River. The vesper sparrow inhabits open grassland and field areas, and may benefit from newly created floodplain in the early stages of succession. Northern goshawk nest and forage in deciduous forested areas, and the barred owl utilizes a mix of wetland and upland forest; each of these species may benefit from the eventual conversion of some areas to forested floodplain. Bobcats are not dependent on impounded or wetland environments for their survival; however, they may benefit from the additional acreage of restored wetland/upland areas which would provide suitable habitat for prey species. Timber rattlesnake are typically associated with rocky mountain slopes and forested habitats, including forested wetlands during summer months. The proposed project would not impact any forested wetland habitat, but may create such habitat over time.

Mussel species may be impacted by dam removal through mechanical disturbance and crushing and/or sediment smothering. An approved avoidance plan and/or relocation plan will be established for State-listed mussel species.

4.2.3 FEDERAL THREATENED AND ENDANGERED SPECIES

The Endangered Species Act of 1973 (ESA; 87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) provides protection for species of fish, wildlife, plants, and invertebrates that are listed as threatened or endangered in the United States or elsewhere. The ESA outlines procedures for Federal agencies to follow when taking actions that may jeopardize Federally listed species or their designated critical habitat.

A Section 7 evaluation was completed and concurred with by the Service on September 28, 2017. In their evaluation, the Service determined that the following Federally listed threatened and endangered species that may potentially occur in the Paulins Kill watershed are: Indiana bat; northern long-eared bat; dwarf wedgemussel; and bog turtle. The Section 7 concurrence for the project area determined: *No Effect* for Indiana Bat; *No Effect* for northern long-eared bat; *No Effect* for dwarf wedgemussel; and *No Effect* for bog turtle.

4.3 LAND USE AND PROPERTY OWNERSHIP

4.3.1 AFFECTED ENVIRONMENT

The Paulins Kill River is a 41.6-mile-long tributary of the Delaware River that runs through Sussex and Warren counties in northwestern NJ. It is NJ's third-largest tributary to the Delaware River, behind the Musconetcong River and the Maurice River. The Paulins Kill drains an

approximate area of 177 square miles, and is located in the Appalachian Ridge and Valley Province.

Table 2 summarizes the land cover characteristics of the Paulins Kill watershed (Homer *et. al* 2015). Land cover characteristics within a 5-mile vicinity of the Columbia and Remnant Dams are approximately identical to the characteristics exhibited in the watershed as a whole.

The State of New Jersey owns the Columbia and Remnant Dams and is responsible for the maintenance of the dams and their ancillary structures. The Dams are predominantly surrounded by 1,098 acres of the surrounding Columbia Wildlife Management Area (WMA), a land tract administered and managed by the NJ Division of Fish and Wildlife for fish and wildlife habitat, and fish and wildlife-associated recreation. Several privately owned properties are located within 200 feet of the river near the upstream extent of the proposed project area.

Table 2. Land cover characteristics of the Paulins Kill watershed.

Category	Acres	Percent of Watershed
Urban	13,339	11.8
Forest	56,154	49.6
Barren	280	0.3
Agriculture	11,500	10.2
Shrubland/Herbaceous	12,766	11.3
Open Water	3,496	3.1
Wetlands	15,722	13.9

4.3.2 ENVIRONMENTAL CONSEQUENCES

ALTERNATIVE A – NO ACTION

Under Alternative A, no changes in land use and property ownership would occur.

ALTERNATIVE B – DAM REMOVAL

Removal of the Columbia and Remnant Dams would transform the lower Paulins Kill River to a free-flowing reach. The most recognizable changes would occur in-river and within the former Columbia impoundment, with no anticipated changes in land cover in the surrounding watershed as a whole. During and following the impoundment drawdown and dam removals, a primary river channel would reestablish through the former impoundment, and the majority of land previously submerged under the impoundment would be exposed. Over time, this exposed land would revegetate, and depending on local elevation, would become wetland, lowland, and/or upland areas. As such, the restoration would create a 44.5-acre natural mosaic of river, wetlands, and uplands within the footprint of the former impoundment.

The majority of the project area is located within 1,098 acres of the NJ Columbia WMA. The Columbia WMA is owned and managed by the State of New Jersey for the purpose of ecological conservation and outdoor recreation; there would be no anticipated changes to this property as a result of the proposed project. Several residential and private properties are located at the upstream extent of the proposed project area. Property values for homes and other nearby structures are based on condition and age of structures, square footage, development trends, and

other factors unrelated to the existence or non-existence of the Columbia and Remnant Dams. Depending on the individual property owner's perspective, the dams can be viewed as an asset or liability, and restoring the river to a free-flowing condition can be viewed differently depending on individual perspectives. The removal of the Columbia and Remnant Dams does not increase the risk of flooding for adjacent properties, and no other negative impacts resulting from the proposed action are anticipated to negatively impact surrounding properties.

4.4 RECREATION

4.4.1 AFFECTED ENVIRONMENT

Recreational opportunities in the vicinity of the Columbia and Remnant Dams include fishing, boating, canoeing/kayaking, wildlife viewing, hiking, and hunting. The Columbia and Remnant Dams are surrounded by 1,098 acres of the Columbia WMA, which affords a variety of outdoor recreational activities (*see regulations*: www.nj.gov/dep/fgw/wmaregs.htm). Public boat access to the Columbia Lake is provided by a gravel/dirt boat ramp accessed from Columbia Lake Road. Boats are restricted to electric motors only. The NJDEP routinely stocks trout in Columbia Lake, and in the lower Paulins Kill River.

4.4.2 ENVIRONMENTAL CONSEQUENCES

ALTERNATIVE A – NO ACTION

Under Alternative A, there would be no change in current recreational opportunities. However, as the Columbia impoundment continues to infill with sediment, the impoundment would become less conducive to some boating, fishing, and hunting opportunities. Degraded water quality (*i.e.*, temperature, dissolved oxygen) would continue to limit the trout fishery to put and take, and would negatively affect the distribution and abundance of other game species. Therefore, the long-term availability of some recreational opportunities would be reduced under the No Action Alternative.

ALTERNATIVE B – DAM REMOVAL

The types of recreational activities provided by impoundments differ than those of free-flowing rivers, therefore dam removal would lead to some changes in recreational opportunities. Although public users would retain their ability to boat, fish, hike, hunt, and view wildlife, the nature of some of these activities would differ in a riverine environment. Most notably, the transition from impoundment to river would change the recreational navigability of the system. The lower Paulins Kill may become less conducive to the use of small draft boats with electric motors, but opportunities for canoeing and kayaking would increase. In addition, the removal of barriers would allow for contiguous navigation to the Delaware River confluence.

It is expected that the lowering of the pool elevation behind the dam would drop bankfull elevations, which may temporarily limit the availability of the gravel/dirt boat ramp currently located on the south side of the impoundment. This may result in an impact to users of this

facility that would be realized until the river channel is stabilized and/or the boat ramp is modified for suitability with new riverine conditions.

The lower Paulins Kill River would continue to support many different sport fish species after dam removal. Dam removal may reduce the distribution of some species that prefer lentic habitats, but is likely to increase the distribution of others for which lotic environments are more suitable. The NJDEP would continue to stock trout species after dam removal. Dam removal would enable resident fishes to move freely in both an upstream and downstream direction, and would reconnect the Paulins Kill River to the Delaware River. This connectivity would have a beneficial impact on both resident (*e.g.*, walleye, catfish, bass) and diadromous fish (*i.e.*, American eel, American shad, blueback herring) commonly targeted by recreational anglers; therefore, providing a positive benefit to recreational fishing opportunities.

Hiking, hunting, and wildlife viewing opportunities would remain relatively unchanged in the proposed project area. The surrounding Columbia WMA would continue to provide a variety of suitable activities for the public. Waterfowl hunting opportunities may change in response to the loss of impounded waters, but waterfowl opportunities exist throughout the surrounding area and therefore impacts would be minimal.

4.5 AIR QUALITY

4.5.1 AFFECTED ENVIRONMENT

The Clean Air Act of 1977 (91 Stat. 685; 42 U.S.C. 7401-7642) requires the EPA to set National Ambient Air Quality Standards (NAAQS) for pollutants considered to be harmful to the environment and public health, and New Jersey is required to meet these standards. Areas of the country where air pollution levels are above a NAAQS may be designated by the EPA as “nonattainment” areas. The proposed project site, situated in Warren County, NJ, is part of the NY-NJ-CT nonattainment area for the 2008 8-hour Ozone NAAQS. The current list of NJ nonattainment areas can be found at: www.epa.gov/airquality/greenbook/ancl.html.

4.5.2 ENVIRONMENTAL CONSEQUENCES

ALTERNATIVE A – NO ACTION

Under Alternative A, there would be no increase in air emissions and consequently, no change or impact to air quality.

ALTERNATIVE B – DAM REMOVAL

Alternative B would result in minor short-term impacts to air quality due to emissions generated by construction equipment. Construction equipment may include, but is not limited to, excavators; dump trucks; and front/backhoe loaders. This type of heavy equipment emits pollutants that contribute to temporary and localized increases in air pollutants such as carbon monoxide, nitrogen oxides, and ozone. Emissions from construction equipment would be controlled by compliance with applicable state and local requirements, and emissions would be

relatively short in duration (up to 3 months). Therefore, emissions from construction equipment and other vehicles should have an insignificant, temporary impact to local air quality. No long-term changes or impacts to local or regional air quality are likely to occur.

4.6 NOISE

4.6.1 AFFECTED ENVIRONMENT

The existing noise environment in the vicinity of the Columbia and Remnant Dams is characterized by natural ambient noise sources including sounds from wildlife, wind, and water movement. Water movement noise varies according to location and discharge level; water movement through Columbia Lake is typically quieter than water movement through confined riverine sections of the Paulins Kill; and water movement over the existing dam structures is typically louder than both of the aforementioned locations. Noise from water movement through all locations is greater at higher discharge levels.

Anthropogenic noise sources include those derived from recreational use, including, but not limited to fishing, hiking, hunting, and boating. Boating activities on Columbia Lake are restricted to the use of electric outboards only. Traffic noise is generated by automobile and truck operations on adjacent low-volume roads, but also from high-volume highways, including I-80. Traffic sounds generated are composed of tire, engine, and exhaust noise. Levels of noise from I-80 may range from 70 to 80 dBA in areas immediately adjacent to the I-80 overpass (Federal Highway Administration 2017). Sounds greater or equal to 85 dBA averaged over 8 hours of exposure are considered potentially harmful to the human ear (Occupational Health and Safety Administration 2002).

4.6.2 ENVIRONMENTAL CONSEQUENCES

ALTERNATIVE A – NO ACTION

The No Action Alternative would not result in any increased noise emissions and consequently would not impact current noise levels in the vicinity of the Columbia and Remnant Dams.

ALTERNATIVE B – DAM REMOVAL

The removal of the Columbia and Remnant Dams and associated restoration activities would result in short-term increases in noise emissions during the construction phase (up to 3 months). Noise emissions would be short-term and the use of construction equipment would be limited to daylight hours. Following the construction phase, the sound of water falling over the Columbia Dam would be eliminated and replaced with more natural riverine sounds associated with riffle and flowing water habitats. No long-term adverse noise impacts would be associated with the dam removals.

4.7 CULTURAL RESOURCES

4.7.1 AFFECTED ENVIRONMENT

The NJDEP lists the Columbia Dam as a historic property identified as the Paulins Kill River Dam (ID 5471; www.nj.gov/dep/gis/geoweb splash.htm). A historic architectural survey identified a total of 5 resources over 50 years old within the proposed project area (Hunter Research Inc. 2016).

Two of these five resources were previously listed or determined eligible for the NJ or National Registers of Historic Places, pursuant to N.J.A.C. 7:7E-3.36 and per NJDEP land use regulations (Warrington Stone Bridge; Columbia Dam and Powerhouse). Three of the resources are recommended as not eligible for the NJ or National Registers of Historic Places (Blairstown Railway segment; remnant of the Paulins Kill Ice and Power Company Dam (*i.e.*, the Remnant Dam); dwelling at 3 Route 46).

4.7.2 ENVIRONMENTAL CONSEQUENCES

ALTERNATIVE A – NO ACTION

Under Alternative A, there would be no change in current infrastructure conditions, and therefore there would be no immediate impact to the cultural resources of the area. However, the owner of the Columbia and Remnant Dams (*i.e.*, the NJDEP) does not desire to repair, rehabilitate, replace, maintain, or reconstruct the existing dams and ancillary structures over time.

ALTERNATIVE B – DAM REMOVAL

Dam removal would have an adverse effect on the Columbia Dam and powerhouse due to the proposed demolition of the dam's spillway and the removal of the powerhouse. These affects will be addressed in concurrence with the NJ State Historic Preservation Office, and documented in a separate report. No adverse effects are anticipated for the National Register-listed Warrington Stone Bridge, and no adverse effects are anticipated for two of the non-eligible structures (Blairstown Railway segment; dwelling at 3 Route 46). The third non-eligible structure, the remnant of the Paulins Kill Ice and Power Company Dam (*i.e.*, Remnant Dam), would be removed.

4.8 SOCIOECONOMIC RESOURCES

4.8.1 DEMOGRAPHIC AND ECONOMIC RESOURCES

4.8.1.1 AFFECTED ENVIRONMENT

The Paulins Kill River flows through Somerset and Warren counties in northwestern NJ. The proposed project area is located entirely within Knowlton Township, NJ. As such, the Knowlton Township geographic area provides an appropriate context for analysis of the socioeconomic conditions in the vicinity of the proposed action.

Table 3 summarizes the demographic and economic characteristics of the proposed project area and project setting. The approximate population of Knowlton Township is 3,055 (U.S. Census Bureau 2010). Minority groups comprise 3.9 percent of the population. The median household income of Knowlton Township in 2015 was \$88,259, with approximately 3.2 percent of the population below the poverty level (American Community Survey 2015). Approximately 7.2 percent of the civilian labor force aged over 16 years is unemployed. The total number of housing units to support the population is 1,212.

Table 3. Demographic and Economic Characteristics.

Category	Knowlton Township
<i>Total Population</i>	3,055
Persons under 18	23.3%
Persons over 65	12.7%
<i>Race</i>	
White	96.1%
Black or African American	0.9%
American Indian or Alaskan Native	0.3%
Asian	0.9%
Two or more races or some other race	1.8%
<i>Income (2015)*</i>	
Median household income	\$88,259
Persons below poverty level	3.2%
<i>Employment (2015)*</i>	
Civilian labor force	1,520
Unemployment rate	7.2%
<i>Housing</i>	
Housing units	1,212
Occupied housing units	1,097

Source: U.S. Census, 2010

* American Community Survey, 2015

4.8.1.2 ENVIRONMENTAL CONSEQUENCES

ALTERNATIVE A – NO ACTION

Under Alternative A, there would be no change in demographic and economic characteristics of resident populations in the vicinity of the proposed project area.

ALTERNATIVE B – DAM REMOVAL

A relatively small, temporary, labor force (approximately 25 workers) would be required to remove the Columbia and Remnant Dams. The required labor is expected to be available from the regional area, and no changes to resident populations are expected. Accordingly, no changes in economic or demographic characteristics are expected.

4.8.2 COMMUNITY FACILITIES AND SERVICES

Community services and facilities refer to those services provided to support residential developments, including law enforcement, fire and emergency services, and water supply

authorities. This section describes the available services in the vicinity of the proposed project area, and the potential for impacts to these community provided services.

Warren County, NJ is served by twelve municipal police departments, the Warren County Sheriff's Office, and the NJ State Police. The County is additionally served by twenty-three municipal and volunteer fire departments and companies (www.co.warren.nj.us/publicsafety). Knowlton Township is served by a volunteer fire rescue department that covers approximately 3,100 residents within 26 square miles, including all of Knowlton Township, part of Hardwick Township, Worthington State Forest, and the Delaware Water Gap National Recreation Area. The department's fleet includes 1 rescue/hazmat support vehicle, 2 engines, 1 water tender, and 1 ambulance (www.knowltonfirerescue.com).

Most of Knowlton Township has no existing sewer service or public water supply areas. All water resources in the Township are provided by private wells. All sewer service is provided by private septic systems, with the exception of one private package sewage plant located at the commercial/industrial development zone of the I-80 and Route 94/46 interchange. There are no existing proposals to extend public sewer or water service to Knowlton Township (Morris Land Conservancy Partners 2008).

A powerhouse adjacent to the Columbia Dam previously served a small portion of the local community with electricity. The NJDEP leased the small hydroelectric facility on the property until November 2016, when the lessee surrendered their FERC license. Maintenance of the dams and ancillary structures is currently the responsibility of the NJDEP, and by proxy, the responsibility of NJ taxpayers.

ALTERNATIVE A – NO ACTION

Under Alternative A, no changes would occur to the use of the project area that would require an increase in police, fire/ambulance, water supply, or any additional community facilities and services. The Columbia Dam powerhouse would not be used for local electricity production; however, there are plans to install solar panels at the NJ Pequest Fish Hatchery, which are expected to generate 47 percent more electricity than the former hydroelectric facility.

ALTERNATIVE B – DAM REMOVAL

Under Alternative B, no changes would occur to the use of the project area that would require an increase in police, fire/ambulance, water supply, or any other community facilities and services. Dam removal would reduce the responsibility of NJDEP (*i.e.*, NJ taxpayers) to incur future costs associated with infrastructure maintenance of the dams and ancillary structures. Consequently, there would be no anticipated impacts to community facilities and services in the vicinity of the project area.

4.9 ENVIRONMENTAL JUSTICE

4.9.1 AFFECTED ENVIRONMENT

Executive Order 12898 *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* addresses the environmental and human health effects of Federal actions on minority and low-income populations. The EO requires that “each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportional high and adverse human health or environmental effects of its programs, policies, and activities on minority populations.”

Guidance for addressing Environmental Justice is provided by the Council on Environmental Quality (CEQ). The CEQ defines minority as any race and ethnicity, as classified by the U.S. Census Bureau (USCB), as: Black or African American; American Indian or Alaska Native; Asian; Hawaiian and other Pacific Islander; some other race (not mentioned above); two or more races; or a race whose ethnicity is Hispanic or Latino (Council on Environmental Quality 1997). Low income populations are based on annual-statistical poverty thresholds defined by the U.S. Department of Health and Human Services (HHS).

The CEQ (1997) states that minority populations exist if either of the following conditions is met:

- The minority population of the impacted area exceeds 50 percent of the total population;
- The ratio of minority population is meaningfully greater (*i.e.*, greater than or equal to 20 percent) than the minority population percentage in the general population or other appropriate unit of geographic analysis.

Low income populations are those with incomes that are less than the poverty level (Council on Environmental Quality 1997). The 2017 HHS Poverty Guidelines states that, an annual household income of \$24,600 for a family of four is the poverty threshold. For an individual, an annual income of \$12,060 is the poverty threshold (U.S. Department of Health and Human Services 2017).

The CEQ (1997) states that a low-income population exists if either of the following conditions is met:

- The low income population exceeds 50 percent of the total number of households;
- The ratio of low-income population significantly exceeds (*i.e.*, greater than or equal to 20 percent) the appropriate geographic area of analysis.

4.9.2 ENVIRONMENTAL CONSEQUENCES

No minority or low income populations are known to occur in the vicinity of the project area, as determined by EPA’s Environmental Justice Screening and Mapping Tool (<https://ejscreen.epa.gov/mapper/>), and a review of current demographic and economic characteristics (U.S. Census Bureau 2010). No changes to the population, income, or racial makeup of Knowlton Township would occur under either the No Action Alternative or Alternative B. Neither of the alternatives would produce environmental pollution, and no

minority or low income populations would be displaced or negatively affected in any other way. Consequently, no environmental justice impacts would occur with either of the alternatives under consideration.

4.10 HUMAN HEALTH AND SAFETY

4.10.1 AFFECTED ENVIRONMENT

The NJDEP classifies the Columbia and Remnant Dams as Class III - Low Hazard. This classification indicates that dam failure is not expected to result in loss of life and/or significant property damage (N.J.A.C. 7:20-1.8). However, both the Columbia and Remnant Dams are ageing structures at greater than 100 years old, and are expected to deteriorate and become increasingly unsafe over time. The owner of the dams (*i.e.*, NJDEP) does not desire to repair, rehabilitate, replace, maintain, or reconstruct either of the existing dam structures.

The Columbia and Remnant Dams are barriers for recreational boaters and anglers, and the aging dams and associated facilities are moderately unsafe from a public safety perspective. The Columbia Dam may create a drowning hazardous referred to as a hydraulic “boil”. As water flows over the dam, it can create a strong recirculating current at the downstream base of the dam. Even on small rivers that appear safe, the force of the boil can trap small boats and individuals, even while wearing a personal floatation device.

4.10.2 ENVIRONMENTAL CONSEQUENCES

ALTERNATIVE A – NO ACTION

Under Alternative A, the Columbia and Remnant Dams would remain for an indeterminate period. However, the dam structures are ageing and would continue to deteriorate over time, becoming increasingly hazardous from both a dam safety and public safety perspective.

ALTERNATIVE B – DAM REMOVAL

Construction activities could pose a short-term risk to public safety, and the contractor is contractually obligated to mitigate and reduce such hazards. For example, no public traffic would be allowed onsite during dewatering and construction, and measures would be implemented to protect the public and workers from damage to self and property. Traffic and pedestrian traffic control signage would be temporarily installed, and would comply with NJ Department of Transportation standards. A temporary closure to County Route 605 (*i.e.*, Warrington Road) is anticipated when construction occurs in the vicinity of the Warrington Road bridge. All construction work would occur during daylight hours. The project design incorporates measures to limit sedimentation and impacts to water quality. Construction debris would be handled and disposed of in accordance to applicable regulations.

River banks adjacent to the impoundment and river in the area of the former impoundment may initially be unstable due to dewatering during the drawdown period and for an indeterminate period afterwards. These areas are expected to become increasingly stable over time after

restoration and revegetation occurs. Due to this temporary increase in bank and floodplain instability, there is a potential human health and safety concern for individuals traversing these areas. Hikers and boaters may be at risk if they enter these areas. The potential for river bank collapse and risks associated with unconsolidated soils may cause falls or result in personal injury. Closing certain sections of the river for a period of time sufficient to allow bank and floodplain stabilization may be warranted.

The removal of the Columbia Dam, the Remnant Dam, and associated structures would eliminate identified public safety hazards and liability risk for the State of NJ. The risk of drowning for boaters and swimmers would be abated. Any long-term risk of dam failure would be eliminated.

4.11 VISUAL QUALITY AND AESTHETICS

4.11.1 AFFECTED ENVIRONMENT

The project area includes a combination of man-made and natural features that contribute to the overall visual composition of the site. The Remnant Dam is breached and partially diverts flow, but allows for a semi-natural free-flowing environment. The Columbia Dam and associated structures have altered the natural flow of the lower Paulins Kill River by converting the river to an impoundment, and thus artificially reshaped the natural viewscape for over 100 years.

The Columbia Dam was originally constructed to provide hydropower for the local community. Though it is no longer actively used for electricity production, the dam and powerhouse add to the visual interest of the site, but detract from the natural aesthetics of the river. While aesthetics are subjective, it should be noted that some people may prefer man-made impoundments over natural riverscapes. It has also been suggested that the presence of dams may even appear as waterfalls to some individuals.

4.11.2 ENVIRONMENTAL CONSEQUENCES

ALTERNATIVE A – NO ACTION

The No Action Alternative would not alter the current visual quality and aesthetics of the proposed project area. However, Columbia Lake would continue to infill with sediment over time, which would lead to shallower water, larger sandbars, and increased aquatic weeds. In addition, the dams and ancillary structures are ageing and would continue to deteriorate over time. Cumulatively, these changes would lead to changes in the overall visual quality of the proposed project area.

ALTERNATIVE B – DAM REMOVAL

The removal of the Columbia Dam and powerhouse and the Remnant Dam would alter the current visual character of the proposed project area. During and following the impoundment drawdown and dam removals, a primary river channel would reestablish through the impoundment at approximately the location of the current channel thalweg. The majority of the land previously submerged under the impoundment would be exposed and is likely to be visually

undesirable in the short-term. However, early successional species from the seed bank and carried in by the wind, water, and wildlife would quickly revegetate these exposed areas. This process would be hastened by active manual restoration of floodplain features and revegetation using seed, stakes, shrubs, and trees.

Over time, these areas would begin to resemble the existing floodplains and riparian zones that presently exist upstream and downstream of the proposed project area. Landscape views would transition as the initial herbaceous community gives way to scrub shrub, and eventually forested communities. Active vegetation management practices would help to prevent the establishment of non-native invasive species, and would shorten the adverse effects on the visual quality and aesthetics of the site.

The removal of the dams and associated structures may diminish the visual quality of the site for some visitors, however the river corridor would in time be returned to near natural, pre-dam flow conditions, and the natural scenic aesthetics of the river ecosystem would be restored.

5.0 CUMULATIVE IMPACTS

The Service has determined that the proposed project is unlikely to contribute to potentially additive effects on environmental resources impacted by the project. The proposed project would have an adverse impact on a historic structure (*i.e.*, Columbia Dam and powerhouse) that is listed or determined eligible for the NJ or National Registers of Historic Places (*see* Section 4.7); this impact would be addressed in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended (80 Stat. 915; 16 U.S.C. Section 470 *et seq.*).

The implementation of the proposed project is expected to restore the lower Paulins Kill River and provide fish passage for historic populations of American shad, blueback herring, and American eel. In addition, the project would restore 44.5 acres of wetland and floodplains; improve degraded water quality; reduce localized flooding; increase recreational fishing and paddling opportunities; reduce long-term maintenance and liability costs for the dam owner; and eliminate a looming public health and recreational safety hazard.

The project is not expected to have long-term adverse impacts on water resources, biological resources, land use, recreation, air quality, noise, socioeconomic resources, visual quality, or human health.

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APPENDIX 1. PUBLIC COMMENTS



November 30, 2017

Dr. Cathy Marion
U.S. Fish and Wildlife Service
4 East Jimmie Leeds Road
Galloway, New Jersey 08205

Re: Comments in response to the DRAFT *Restoration Plan and Environmental Assessment Addendum: Combe Fill South Landfill Superfund Site, Morris County, New Jersey.*

Dear Dr. Marion,

Thank you for the opportunity to provide comments on the DRAFT *Restoration Plan and Environmental Assessment Addendum*. American Rivers strongly supports the aquatic restoration projects selected by the U.S. Fish and Wildlife Service to restore natural resources similar to those injured due to the release of hazardous substances at the Combe Fill South Landfill Superfund Site and identified as: "Columbia Dam and Remnant Removal" (AKA Columba Dam removal) and "Activities Associated with the Warren Glen Dam Removal" (AKA Warren Glen Dam removal).

American Rivers has provided technical expertise and guidance during all phases of the Columbia Dam removal project to date, serving as project manager for the study, design, and permitting phases of the project; we also provide on-going technical support to the Warren Glen Dam removal project as a member of the Musconetcong River Restoration Partnership. As a result of our engagement on these projects, we have extensive knowledge of both the impacts of the dams as well as the ecological and recreational benefits that will result from their removal.

The Columbia and Warren Glen Dams: disrupt the natural flow regime and slow the movement of water; create stagnant conditions that lead to poor water quality upstream of the dams, including increased temperatures and decreased availability of oxygen; alter sediment transport, deposition, and sorting - and in turn, the formation and maintenance of natural instream habitats like riffles and pools, limiting which species of plants and wildlife can tolerate living in the dammed rivers; obstruct migration and movement of resident and migratory fish and other aquatic taxa; and fragment the river corridor, isolating aquatic habitats and biotic communities.

Removal of these dams will: restore historic connectivity with the Delaware River that is critical to recover and sustain diadromous fish species of conservation concern, including the blueback herring (*Alosa aestivalis*), American shad (*Alosa sapidissima*), and American eel (*Anguilla rostrata*); restore passage for resident fish and other aquatic taxa; address a major cause of water quality impairment; restore free-flowing conditions and natural riverine processes responsible for creation and maintenance of habitat necessary for native fauna; eradicate the public safety risk posed by the presence of the dams; eliminate future maintenance costs; and create opportunities for fly fishing and recreational paddling. The outcome of these restoration projects will be self-sustaining (i.e., will not require maintenance or on-going management) and resilient to expected ranges of environmental stress and disturbance, including those associated with future climate.

American Rivers' mission is to protect wild rivers, restore damaged rivers, and conserve clean water for people and nature. Since our founding in 1973, we have worked to designate more than 12,000 miles of rivers across the country as "Wild and Scenic," safeguarded public health by helping eliminate sewage pollution in waterways, restored habitat for fish and wildlife, provided scientific and legislative expertise on behalf of rivers and clean water, and delivered advocacy leadership to the nation's growing river conservation movement. We are nationally recognized experts in river restoration due to our effective dam removal advocacy, planning and project implementation, technical expertise, proven successes, and collaborative approach. Over two decades, we have helped remove over 250 dams nationwide, resulting in improved water quality, recreation, and wildlife habitat. We fully support the removal of the Columbia and Warren Glen Dams to restore the health of New Jersey's rivers and are pleased that the U.S. Fish and Wildlife Service has identified these high-value projects for support.

Sincerely,

A handwritten signature in black ink, appearing to read "Laura Craig", with a stylized flourish at the end.

Laura Craig, Ph.D.
Director of Science & Economics and River Restoration

[Submitted by e-mail to Cathy_Marion@fws.gov; subject line "Columbia Dam Comments"]



Musconetcong Watershed Association

November 29, 2017

Cathy Marion
U.S. Fish and Wildlife Service
New Jersey Field Office
4 E. Jimmie Leeds Rd., Unit 4
Galloway New Jersey, 08205

RE: Dam Removal Comments

The Musconetcong Watershed Association (MWA) supports the use of Natural Resources Damages Assessment funds for the Columbia Dam Removal (see attached) and Proposed Restoration Project 2 - Activities Associated with the Warren Glen Dam Removal.

The MWA is an independent, non-profit organization dedicated to protecting and improving the quality of the Musconetcong River and its Watershed, including its natural and cultural resources. The region served encompasses the Musconetcong River watershed, a drainage area of 157.6 square miles in northwest New Jersey which includes portions of Morris, Hunterdon, Warren and Sussex counties, and all or parts of 25 municipalities. The Musconetcong River runs 42 miles from Lake Hopatcong to the Delaware River.

Last year we completed the removal of the Hughesville dam, a 16 foot high, 150 foot wide structure. As a direct result, American Shad returned this year to this river section for the first time in at least 100 years, and this year the Delaware River had its ninth largest Shad count in 92 years (see attached N.J. Department of Environmental Protection press releases). The Shad were observed at the base of the Warren Glen Dam unable to proceed further up the river, confirming the Warren Glen Dam is a significant blockage to migratory fish. Also, removing this dam would reconnect 8 miles of the Musconetcong River to streams that are classed by NJDEP as trout producing for native Brook Trout.

The Warren Glen Dam is a high-hazard dam. It has been noted to be in a poor condition, with a persistent leak since at least 1980. An Army Corps of Engineers report from March 1981 identified the very poor condition of the dam, its inability to meet design standards for a 100 year flood event, and documented a leak at the base of the dam. An assessment 2012 assessment by French and Perrello conducted in 2012 indicated the very poor condition of the dam, observed seepage from *four* different parts of the dam, and indicated that the current capacity of the dam spillway is about one-quarter the capacity needed to prevent downstream flood damage.

Clearly, removing the Warren Glen Dam will promote migratory fish passage, remove a hazard hazardous to health and safety, improve water quality, and enhance recreational access.

Sincerely,

Alan Hunt, Ph.D., Executive Director

Musconetcong Watershed Association • 10 Maple Avenue • P.O. Box 113, Asbury, New Jersey 08802
908-537-7060 • www.musconetcong.org



Musconetcong Watershed Association

November 17, 2017

John H. Moyle, P.E. Director
Division of Dam Safety & Flood Control
New Jersey Department of Environmental Protection
PO Box 420
Trenton, NJ 08625-0420

RE: Support for Removal of the Columbia Dam

The Musconetcong Watershed Association (MWA) supports the removal of the Columbia Dam from the Paulins Kill River. We have conducted five dam removals with partners on the Musconetcong River, and have seen improvements to public safety, water quality, wildlife habitat, and recreational access to the river.

The MWA is an independent, non-profit organization dedicated to protecting and improving the quality of the Musconetcong River and its Watershed, including its natural and cultural resources. The region served encompasses the Musconetcong River watershed, a drainage area of 157.6 square miles in northwest New Jersey which includes portions of Morris, Hunterdon, Warren and Sussex counties, and all or parts of 25 municipalities. The Musconetcong River runs 42 miles from Lake Hopatcong to the Delaware River.

Last year we completed the removal of the Hughesville dam, a 16 foot high, 150 foot wide structure. This was the third in a series of dam removals on the Musconetcong River, and opened more than five miles of the river to the Delaware River. As a direct result, American Shad were able to return this year, for the first time in at least 100 years, and this year the Delaware River had its ninth largest Shad count in 92 years.

Before the removal, the impoundment behind the dam was slow-moving, filled with thick algae, and the river bottom was covered with thick silt, which would smell when the river ran low. After the removal, the water is clear and free flowing. In the words of one neighbor to the dam, he said "it looks like a Rocky Mountain river now." That same neighbor's daughter had her wedding along the river banks this summer, because "It was so nice back there now."

Removing an obsolete dam removes a safety hazard, restores the entire length of the river that was impounded, promotes new fish habitat, and can increase the recreational access to the river. For these reasons, the MWA urges the New Jersey Department of Environmental Protection to proceed with the removal of the Columbia Dam.

Sincerely,

Alan Hunt, Ph.D., Executive Director

Bill Leavens, Secretary

Musconetcong Watershed Association • 10 Maple Avenue • P.O. Box 113, Asbury, New Jersey 08802
908-537-7060 • www.musconetcong.org



P.O. Box 113, Asbury, NJ 08829

Cathy Marion
U.S. Fish and Wildlife Service
New Jersey Field Office
4 E. Jimmie Leeds Rd., Unit 4
Galloway New Jersey, 08205

RE: Dam Removal Comments

The Musconetcong River Management Council has experience with five dam removals on the Musconetcong River. The Musconetcong River Management Council implements the National Wild and Scenic River Management Plan in fourteen municipalities including the Township of Allamuchy, Township of Bethlehem, Borough of Bloomsbury, Township of Byram, Township of Franklin, Township of Greenwich, Town of Hackettstown, Borough of Hampton, Township of Independence, Township of Lebanon, Township of Mansfield, Township of Mount Olive, Township of Washington (Morris County), Township of Washington (Warren County), and four counties (Warren, Sussex, Morris, and Hunterdon). The Counties and Mayors from most of these municipalities have appointed citizens to serve as representatives on the Musconetcong River Management Council.

The purpose of the Musconetcong River Management Council is to implement the River Management Plan which was developed as a required step in the National Wild and Scenic Rivers Study. An important part of this designation is maintaining and enhancing the natural and free flowing conditions of the river, as well as conserving cultural resources and promoting recreational access. The MRMC uses the River Management Plan to promote the long-term protection of the Musconetcong River by: (1) bringing those involved in river issues together on a regular and ongoing basis, (2) stimulating cooperation and coordination among those organizations and individuals, (3) providing a forum for all river interests to discuss and resolve issues, and (4) coordinating implementation of the River Management Plan. The MRMC has supported dam removals on the Musconetcong River, notably at Riegelsville, Finesville and Hughesville. Through these removals we saw the return of American Shad to the Musconetcong this year, the first time in hundreds of years.

The MRMC supports removal of the Columbia Dam (see attached) and the Proposed Restoration Project 2 - Activities Associated with the Warren Glen Dam Removal. Warren Glen Dam is the largest dam on the main stem of the Musconetcong River, at 39 feet, and prevents fish migration and limits recreational use of the Musconetcong River. The dam structure is also in very poor condition, and has been known to be a hazard to downstream communities since the 1980s. The Musconetcong River Management Council supports the funding for a feasibility study and related removal activities for Warren Glen Dam.

Sincerely,

A handwritten signature in blue ink, appearing to read "Charlie Fineran".

Charlie Fineran, President



P.O. Box 113, Asbury, NJ 08829

November 13, 2017

RE: Removal of the Columbia Dam at the Columbia Lake Wildlife Management Area

The Musconetcong River Management Council has experience with five dam removals on the Musconetcong River. The Musconetcong River Management Council implements the National Wild and Scenic River Management Plan in fourteen municipalities including the Township of Allamuchy, Township of Bethlehem, Borough of Bloomsbury, Township of Byram, Township of Franklin, Township of Greenwich, Town of Hackettstown, Borough of Hampton, Township of Independence, Township of Lebanon, Township of Mansfield, Township of Mount Olive, Township of Washington (Morris County), Township of Washington (Warren County), and four counties (Warren, Sussex, Morris, and Hunterdon). The Counties and Mayors from most of these municipalities have appointed citizens to serve as representatives on the Musconetcong River Management Council.


The purpose of the Musconetcong River Management Council is to implement the River Management Plan which was developed as a required step in the National Wild and Scenic Rivers Study. An important part of this designation is maintaining and enhancing the natural and free flowing conditions of the river, as well as conserving cultural resources and promoting recreational access. The MRMC uses the River Management Plan to promote the long-term protection of the Musconetcong River by: (1) bringing those involved in river issues together on a regular and ongoing basis, (2) stimulating cooperation and coordination among those organizations and individuals, (3) providing a forum for all river interests to discuss and resolve issues, and (4) coordinating implementation of the River Management Plan. The MRMC has supported dam removals on the Musconetcong River, notably at Riegelsville, Finesville and Hughesville, last year. Through these removals we saw the return of American Shad to the Musconetcong this year, the first time in hundreds of years.

The MRMC supports removal of the Columbia Dam, located on 1,000 acres of preserved open space and open to all of the state's residents, because it will:

- Reopen 10 miles of stream to migratory fish including shad;
- Improve aquatic habitat for native species;
- Increase angling and paddling opportunities;
- Remove a public safety hazard, and
- Avoid costs associated with inspection and maintenance of the dam, which will be borne by taxpayers.

Sincerely,


Charlie Finneran, President


Bill Leavens, Secretary


Alan Hunt, Executive Director



November 30, 2017

Cathy Marion
U.S. Fish and Wildlife Service
New Jersey Field Office
4 E. Jimmie Leeds Rd., Unit 4
Galloway New Jersey, 08205

Re: Restoration Plan and Environmental Assessment (RP/EA) Comments

The North Jersey Resource, Conservation and Development Council (NJRC&D) supports the use of Natural Resources Damages Assessment funds for 1) the removal of the Columbia and Remnant Dams, located on the Paulins Kill River; and 2) activities associated with the removal of the Warren Glen Dam, located on the Musconetcong River.

NJRC&D is a nonprofit organization initiated in 1962 to help people care for and protect their natural resources to improve an area's economy, environment and living standards. We work within Hunterdon, Warren, Morris, Somerset, Sussex and Union counties. NJRC&D has been a partner to dam removals along the Musconetcong River.

Removing both the Columbia Dam and the Warren Glen Dam is important work that will reduce long-term maintenance and liability costs for the dam owner and public; eliminate a public health and recreational safety hazard; improve water quality; reduce localized flooding; improve fish passage and restore native free-flowing riverine habitat.

Sincerely,

Laura Tessieri
Associate Director

10 Maple Ave, P.O. Box 117
Asbury, NJ 08802
(908) 574-5368
www.northjerseyrcd.org

U.S. Department of Interior

U.S. Fish and Wildlife Service

**Approval of the Final Restoration Plan and Environmental Assessment Addendum
Combe Fill South Landfill Superfund Site**

In accordance with the U.S. Department of Interior (DOI) policy regarding documentation for Natural Resource Damage Assessment and Restoration projects (521 DM 3), the Authorized Official for the DOI must demonstrate approval of draft and final Restoration Plans and their associated National Environmental Policy Act documentation, with concurrence from the DOI Office of the Solicitor.

The Authorized Official for the Combe Fill South Landfill Superfund Site is the Regional Director for the U.S. Fish and Wildlife Service's Northeast Region.

By the signatures below, the Final Restoration Plan and Environmental Assessment Addendum for the Combe Fill South Landfill Superfund Site is hereby approved.

Approved by:



Wendi Weber
Regional Director
Northeast Region
U.S. Fish and Wildlife Service

JAN - 8 2018

Date

Concurred:



Mark Barash
Senior Attorney
Northeast Region
Office of the Solicitor

1/23/2018

Date

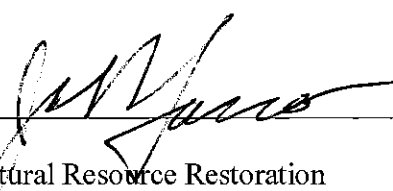
State of New Jersey

New Jersey Department of Environmental Protection


**Approval of the Final Restoration Plan and Environmental Assessment Addendum
Combe Fill South Landfill Superfund Site**

In accordance with Trustee protocol regarding documentation for Natural Resource Damage Assessment and Restoration Projects, the New Jersey Department of Environmental Protection is providing its approval of the Final Restoration Plan and Environmental Assessment Addendum for the Combe Fill South Landfill Superfund Site.

Approved by:



John Sacco
Office of Natural Resource Restoration
New Jersey Department of Environmental Protection



Date


United States Fish and Wildlife Service

ENVIRONMENTAL ACTION STATEMENT

**Final Restoration Plan and Environmental Assessment Addendum
Combe Fill South Landfill Superfund Site**

Within the spirit and intent of the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (NEPA) and other statutes, orders, and policies that protect fish and wildlife resources, I have established the following administrative record and have determined that the action of the Final Restoration Plan and Environmental Assessment Addendum for the Combe Fill South Landfill Superfund Site in Morris County, New Jersey:

- ☐ is a categorical exclusion as provided by 516 DM 6, Appendix 1 and/or 516 DM 2, Appendix 1. No further NEPA documentation will therefore be made.
- ☒ is found not to have significant environmental effects as determined by the attached Environmental Assessment and Finding of No Significant Impact.
- ☐ is found to have significant effects, and therefore further consideration of this action will require a notice of intent to be published in the Federal Register announcing the decision to prepare an Environmental Impact Statement (EIS).
- ☐ is not approved because of unacceptable environmental damage, or violation of U.S. Fish and Wildlife Service mandates, policy, regulations, or procedures.
- ☐ is an emergency action within the context of 40 CFR 1506.11. Only those actions necessary to control the immediate impacts of the emergency will be taken. Other related actions remain subject to NEPA review.



Regional Director / DOI Authorized Official

Jan 8, 2018
Date