



November 20, 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

Dear Mr. Moyle:

Removal of the Columbia Dam on the Paulins Kill represents the best of ecological restoration in New Jersey, and the Delaware Riverkeeper Network strongly supports the current proposal to remove this major barrier and to restore the Paulins Kill for migratory fish, for local residents, for residents throughout the state, and for the future generations who will benefit from restoring the full ecological health of this important New Jersey river system. We fully support the permitting of both the dam removal and the ecological restoration of the former reservoir area.

Established in 1988 upon the appointment of the Delaware Riverkeeper, DRN is a nonprofit 501(c)(3) membership organization. DRN's professional staff and volunteers work throughout the entire Delaware River Watershed including portions of New Jersey, Pennsylvania, New York, and Delaware. DRN provides effective environmental advocacy, volunteer monitoring programs, public education, stream restoration and stormwater management projects. As stated in our mission statement, "The Delaware Riverkeeper Network champions the rights of our communities to a Delaware River and tributary streams that are free-flowing, clean and healthy." The Paulins Kill is among the cleanest and most ecologically intact of the large New Jersey tributaries to the Delaware River, and restoration activities such as removing this first blockage for migratory fish accelerate further improvements toward a fully functioning and connected river ecosystem. There may be no better opportunity to enhance the ecological health of the Paulins Kill at this time than to remove the Columbia dam.

The many far-reaching implications for the Columbia Dam removal begin with the restoration of migratory fish to this remarkably healthy river system. This major dam (over 15 feet in height) sits less than a half mile from the confluence with the Delaware River, the largest undammed river in the eastern U.S. and one of the last strongholds for at-risk migratory fishes such as American Shad, Blueback Herring, Alewife, and

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American Eel. As the third largest tributary to the Delaware River in New Jersey, the Paulins Kill (also referred to as the Paulinskill River) therefore serves as one of New Jersey's preeminent nursery and rearing grounds for these key migratory fish species. This essential function of the Paulins Kill has been missing for over 100 years now, and New Jersey residents have been deprived of the many benefits from these migratory fish species for more than a century. It is time to rectify the elimination of migratory fishes from the Paulins Kill and reestablish the Paulins Kill as among the state's most important nursery grounds for anadromous and catadromous fishes.

It is well established that migratory fish play myriad key roles in their freshwater ecosystems, enhancing the diversity, resiliency, and ecosystem function of these streams and rivers. Migratory fishes (especially shad and herring) serve as a crucial forage base for recreational fishes such as Smallmouth Bass and Striped Bass. These same migratory fishes are the key link in the complex life cycle of a number of freshwater mussels that call the Paulins Kill home. Migratory fishes can play a vital role in the transport of energy and nutrients to and from marine ecosystems, including such unique and peculiar fishes as Sea Lamprey. Migratory fishes are also increasingly recognized as keystone species in stream and river systems, at times controlling the flow of energy in the local ecosystem and the diversity of other species within the community. With so many key roles, the elimination of migratory fishes starves rivers and streams of many vital attributes and deprives both the ecosystems and the human communities of their rich potential.

To maximize these benefits for migratory fish from the Columbia Dam removal, we encourage NJDEP-Dam Safety and all project partners to continue to work vigorously and creatively to maximize fish passage and ecological restoration throughout the project area. Particularly in balancing the demands for infrastructure protection, such as in the constriction under the present Interstate 80 bridge, the needs for migratory fish passage across all species need to be central to all design options. We recognize that a project with this level of complexity, located in this setting, will lead to competing ecological and human demands. We expect that the commitment of all project partners toward ecological restoration will result in full protection and restoration, and our support and enthusiasm for the Columbia Dam removal and Paulins Kill restoration remains undiminished by the complexity and constraints for balancing competing demands.

As with benefits for migratory fish, the Columbia Dam removal will likewise lead to numerous important benefits for the water quality of the Paulins Kill. Water temperatures regimes will return to the more natural patterns so important for the life history of native species, including lower summer water temperatures in the river as the slow, high-light environment of the impoundment is converted to a riverine system with an extensive vegetated floodplain. The dissolved oxygen regime will similarly return to an improved and more natural regime, with higher saturation conditions maintained through the combined effects of the turbulent and high surface area of a river system, the shading of the restored floodplain, and the cooler temperature regimes from removal of the impoundment. Even the quality and quantity of food transported in the water column will improve as the artificial impoundment and its planktonic-based productivity revert back to the more natural and healthy benthic-based productivity of the Paulinskill River, which further sustains native species over non-natives and invasives. Indeed, the extraordinarily high abundance of the Asian Clam (*Corbicula fluminea*) immediately below the Columbia Dam is a key indicator of the artificial food regime created by the impoundment.

Of course, the former river channel that now flows through the impoundment may see some of the single biggest improvements in this restoration work. What is now a sediment-laden reservoir bottom with low

ecological diversity will evolve back toward a river channel with greater habitat heterogeneity, increased diversity of fish and invertebrates, more natural ecosystem functions, and a continuity with both upstream and downstream riverine habitats. The lateral edges of the impoundment will likewise be restored to a more natural condition, with vegetated riparian floodplains hosting diverse plant and animal species that have been reduced or eliminated because of the impoundment.

The elimination of this major dam and impediment on the Paulins Kill will restore other key aspects of river and stream connectivity. This includes the downstream transport of sediment which, in an intact and healthy system such as the Paulins Kill, helps to maintain the requisite diversity of habitats within the Paulins Kill itself as well as the downstream habitats in the Delaware River. Connectivity is likely to extend upstream for species beyond the typical migratory fishes often celebrated during dam removals. Resident species will have the opportunity to seek habitats and resources both downstream and upstream throughout the year, with the Paulins Kill likely benefitting from the pool of fish and invertebrate species in the much larger Delaware River downstream, and then returning the benefits through downstream transport and migration.

The restoration of water quality, habitats, and connectivity in the Paulins Kill via dam removal will lead to major improvements for the foundations of the river's food web. Improvements and restoration to the algal community and native aquatic plant species will be rapid and far-reaching. The benthic invertebrate community will likewise respond directly to the restoration of the river system, and will respond indirectly through the improvements to temperature, dissolved oxygen, and the natural riverine food resources. Indeed, a large and more diverse pool of native invertebrates has already been documented through benthic insect and biomonitoring surveys below the dam and through freshwater mussels surveys in the reach between the dam and the Delaware River. This downstream pool of species, in addition to the upstream pool of species in the mainstem Paulins Kill and its tributaries, will rapidly colonize the new river channel and enhance the ecological health and the overall biodiversity of this important river.

One group of invertebrates, the freshwater mussels in the family Unionidae (the pearly mussels), represent another of the greatest potentials for uplift via the Columbia Dam removal. The Paulins Kill already hosts one of New Jersey's most healthy and diverse freshwater mussel communities, including the federally endangered Dwarf Wedgemussel (*Alasmidonta heterodon*) as well as a number of state-listed species. Yet at least two of these freshwater mussels, the Eastern Elliptio and the Alewife Floater (*Elliptio complanata* and *Anodonta implicata*, respectively), largely depend on migratory fish as their larval-stage hosts for their unique and complex life history. The opening of tens of miles of the Paulins Kill system to migratory fishes such as American Eel, Blueback Herring, and Alewife may accelerate the restoration of healthy and expanding populations of these native freshwater mussels. The broader restoration of habitats and the improvement to water quality discussed above will likewise benefit native freshwater mussels and could enhance their populations. This could lead to a "virtuous cycle" or positive feedback loop where improved water quality and improved habitats lead to further improvements in freshwater mussels and other native species, which then leads to further improvements in water quality, habitats, and ecological integrity, and greater ecosystem resilience in the face of an uncertain future. As with many ecological systems, the direct and indirect effects of human actions can be far-reaching; for the Paulins Kill, it is expected that these compounded effects will lead to far-reaching improvements for the entire ecosystem, including but not limited to these native freshwater mussels.

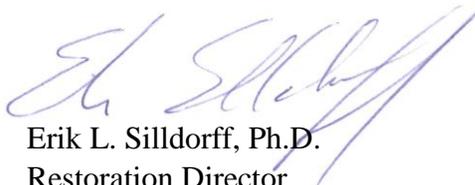
In addition to the aspects of ecological restoration, it is likewise important to highlight the commitment of The Nature Conservancy and its partners not only to restoration through this dam removal, but also to documenting these many and varied improvements to the Paulins Kill in the years to come. The team of collaborators assembled is both impressive and important to ensure the success of the project and to unequivocally establish the uplift to the Paulins Kill system. This commitment clearly demonstrates the appreciation and respect The Nature Conservancy and its team have for the magnitude of this restoration project and for the long-term likelihood of its success.

The opportunity to remove the Columbia Dam represents a truly momentous chance for ecological restoration. The Delaware Riverkeeper Network enthusiastically supports the project, and supports the issuance of permits for both dam removal activities and the broader restoration of the Paulins Kill and its riverine floodplain.

Sincerely,



Maya K. van Rossum
the Delaware Riverkeeper



Erik L. Silldorff, Ph.D.
Restoration Director