UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

AUG 2 6 2019

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Dr. Michael Asaro
Assistant Regional Administrator for Protected Resources
U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Marine Fisheries Service
Greater Atlantic Regional Fisheries Office
55 Great Republic Drive
Gloucester, MA 01930-2276

Re: Request for Concurrence with Proposed Revised Biological Evaluation
Draft NPDES Permit No. DC0000019
Washington Aqueduct

Dear Dr. Asaro,

We are preparing to reissue a National Pollutant Discharge Elimination System (NPDES) Permit for the proposed project as described below. In accordance with the Endangered Species Act (ESA) Section 7 requirements, we have made the determination that re-initiation of consultation is necessary at this time. This letter is to request Endangered Species Act (ESA) concurrence from your office for the renewal of the Washington Aqueduct Permit No. DC0000019. We previously completed formal consultation with your office in 2003 and 2010, which produced Biological Opinions. In 2011, no re initiation was required after a deadline for compliance was altered. Re-initiation of consultation is required where discretionary federal involvement or control over the action has been retained or is authorized by law and: (a) the amount or extent of taking specified in the incidental take statement is exceeded; (b) new information reveals effects of the action that may not have been previously considered; (c) the identified action is subsequently modified in a manner that causes an effect to listed species; or (d) a new species is listed or critical habitat designated that may be affected by the identified action. Based on the information and analysis we have put together, we have determined that re-initiation of consultation is required at this time to address the level of effects that the new permit authorize, now that compliance thresholds have been met and the discharge of solids and turbidity-causing sediments have ceased being discharged into the Potomac river. We have made the determination that the proposed activities now included under this permit may affect, but are not

likely to adversely affect, any species or critical habitat listed as threatened or endangered by NMFS under the ESA of 1973, as amended. Our supporting analysis is provided below.

I. Proposed Project

The United States Army Corps of Engineers ("the Corps") owns and operates the Dalecarlia and McMillan Water Treatment Plants which supply potable water to approximately one million residents in the District of Columbia; Arlington County, the City of Falls Church, and portions of Fairfax County, Virginia; and Montgomery County, Maryland. The plants provide water at cost to the Wholesale Customers, which are the District of Columbia; Arlington County, Virginia; and the City of Falls Church, Virginia.

An act of Congress created the Washington Aqueduct Division water supply system in the mid-1800's with the construction of the Great Falls Dam and intake, which is located in Maryland, on the Potomac River. There is a second intake at Little Falls, also located in Maryland which the Corps uses intermittently. Water flows by gravity from the Great Falls intake to the Dalecarlia Reservoir. From the forebay, a low-lift booster pump station pumps water into the Dalecarlia Reservoir. The Little Falls pumping station can also deliver water directly to the Dalecarlia Reservoir.

There are seven outfalls and one spring located underneath outfall 002 known as outfall 002Q with varying monitoring requirements (displayed below). The Washington Aqueduct facility completed work on a residuals processing facility in 2012 that has eliminated discharges of sediment to the Potomac River. As a result, the only discharges occurring to the Potomac River would be those of rainwater or partially treated drinking water with a duration of two days, occurring (if at all) every several years.

Table 1: Effluent Limitations and Monitoring Requirements – Dalecarlia Sedimentation Basins – Outfall 002

Parameter	Discharge Limitation				Monitoring Requirements	
	Mass Units (lbs/day)		Others		Sample Frequency	Sample Type
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily		
Flow (MGD)	N/A	N/A	N/A	N/L	1/discharge	Estimate
Total Suspended Solids [1] (mg/l)	N/A	N/A	30	60	1/discharge	Time-weighted 24-hr composite
TSS Influent	N/A	N/A	N/L	N/L	1/discharge	Time-weighted 24-hr composite
Total Aluminum (mg/l)	N/A	467.0	N/L	8.0	1/discharge	Time-weighted 24-hr composite
Total Nitrogen (mg/l)	N/L	N/L	N/L	N/L	1/discharge	Time-weighted 24-hr composite
Total Phosphorus (mg/l)	N/L	N/L	N/L	N/L	1/discharge	Time-weighted 24-hr composite
pH (Std units)	6.0 - 8.5				Daily	Grab
Total Residual Chlorine [2] (mg/l)	No detectable				Daily	Grab*
The discharge shall be free from floating solids, sludge deposits, debris, oil and scum in other than trace amounts.						

(1) See Operation and Maintenance Part 2 Section B (Page 15)
(2) No chlorine shall be discharged in detectable amounts. The discharge of total residual chlorine shall not be greater than the non-detect level of less than 0.1mg/L.
* A grab sample be taken for Total Residual Chlorine which shall be sampled at the start of the discharge.

Table 2: Effluent Limitations and Monitoring Requirements – Dalecarlia Sedimentation Basins - Outfall 002Q

Parameter	Discharge Limitation				Monitoring Requirements	
	Mass Units (lbs/day)		Others		Sample Frequency	Sample Type
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily		
Flow (MGD)	N/A	N/A	N/L	N/L	1/quarter	Estimate
Total Suspended Solids [1] (mg/l)	N/A	N/A	30	60	1/quarter	Grab
Total Aluminum (mg/l)	N/A	3.3	N/L	8.0	1/quarter	Grab
Total Iron (mg/l)	N/A	N/A	N/L	N/L	1/quarter	Grab
Total Nitrogen (mg/l)	N/L	N/L	N/L	N/L	1/discharge	Grab
Total Phosphorus (mg/l)	N/L	N/L	N/L	N/L	1/discharge	Grab
pH (Std units)	6.0 - 8.5				1/quarter	Grab
Total Residual Chlorine [2] (mg/l)	No detectable				1/quarter*	Grab
Perchlorate (mg/l)	N/A	N/A	N/L	N/L	1/quarter	Grab
Chloroform (mg/l)	N/A	N/A	N/L	N/L	1/quarter	Grab
The discharge shall be free from floating solids, sludge deposits, debris, oil and scum in other than trace amounts.						

(1) See Operation and Maintenance Part 2 Section B (Page 15)

(2) No chlorine shall be discharged in detectable amounts. The discharge of total residual chlorine shall not be greater than the non-detect level of less than 0.1mg/L. As specified in the monitoring requirements above, samples shall be taken from an access port in the discharge pipe between the point at which the basin underdrains tie into a single pipe and the point of entry to the Potomac River, accessible from Canal Road north of the Hydro Building.

*In addition to the monitoring requirement of 1/quarter, monitoring will be done at a frequency of 1/day grab whenever pre-chlorination to the Dalecarlia sedimentation basins is occurring.

Table 3: Effluent Limitations and Monitoring Requirements – Georgetown Sedimentation Basins – Outfalls 003, 004

Parameter	Discharge Limitation				Monitoring Requirements	
	Mass Units (lbs/day)		Others		Sample Frequency	Sample Type
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily		
Flow (MGD)	N/A	N/A	N/A	N/L	1/discharge	Estimate
Total Suspended Solids [1](mg/l)	N/A	N/A	30	60	1/discharge	Time-weighted 24-hr composite
TSS Influent	N/A	N/A	N/L	N/L	1/discharge	Time-weighted 24-hr composite
Total Aluminum (mg/l)	N/A	2669	N/L	8.0	1/discharge	Time-weighted 24-hr composite
Total Nitrogen (mg/l)	N/L	N/L	N/L	N/L	1/discharge	Time-weighted 24-hr composite
Total Phosphorus (mg/l)	N/L	N/L	N/L	N/L	1/discharge	Time-weighted 24-hr composite
pH (Std units)	6.0 - 8.5				Daily	Grab
Total Residual Chlorine [2](mg/l)	No detectable				Daily	Grab*
The discharge shall be free from floating solids, sludge deposits, debris, oil and scum in other than trace amounts.						

Samples taken in compliance with the monitoring requirements specified above, shall be taken in an access port in the discharge pipe between the Georgetown Basins and the point of entry into the Potomac River for both Outfall 003 and 004.

(1) See Operation and Maintenance Part 2 Section B (Page 15)

(2) No chlorine shall be discharged in detectable amounts. The discharge of total residual chlorine shall not be greater than the non-detect level of less than 0.1mg/L.

* A grab sample be taken for Total Residual Chlorine which shall be sampled at the start of the discharge.

Table 4: Effluent Limitations and Monitoring Requirements – Georgetown Conduit – Outfall 006

Parameter	Discharge Limitation				Monitoring Requirements	
	Mass Units (lbs/day)		Others		Sample Frequency	Sample Type
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily		
Flow (MGD)	N/A	N/A	N/A	N/L	1/discharge	Estimate
Total Suspended Solids [1](mg/l)	N/A	N/A	30	60	1/discharge	Time-weighted 24-hr composite
Total Aluminum (mg/l)	N/A	50	N/L	1.2	1/discharge	Time-weighted 24-hr composite
Total Nitrogen (mg/l)	N/L	N/L	N/L	N/L	1/discharge	Time-weighted 24-hr composite
Total Phosphorus (mg/l)	N/L	N/L	N/L	N/L	1/discharge	Time-weighted 24-hr composite
pH (Std units)	6.0 - 8.5				1/discharge	Grab
Total Residual Chlorine [2] (mg/l)	No detectable				1/discharge	Grab*
The discharge shall be free from floating solids, sludge deposits, debris, oil and scum in other than trace amounts.						

(1) See Operation and Maintenance Part 2 Section B (Page 15)
(2) No chlorine shall be discharged in detectable amounts. The discharge of total residual chlorine shall not be greater than the non-detect level of less than 0.1mg/L.
* A grab sample be taken for Total Residual Chlorine which shall be sampled at the start of the discharge.

Table 5: Effluent Limitations and Monitoring Requirements – City Tunnel – Outfall 007

Parameter	Discharge Limitation				Monitoring Requirements	
	Mass Units (lbs/day)		Others		Sample Frequency	Sample Type
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily		
Flow (MGD)	N/A	N/A	N/A	N/L	1/discharge	Estimate
Total Suspended Solids [1](mg/l)	N/A	N/A	30	60	1/discharge	Time-weighted 24-hr composite
Total Aluminum[2] (mg/l)	N/A	334	N/L	8.0	1/discharge	Time-weighted 24-hr composite
Total Nitrogen (mg/l)	N/L	N/L	N/L	N/L	1/discharge	Time-weighted 24-hr composite
Total Phosphorus (mg/l)	N/L	N/L	N/L	N/L	1/discharge	Time-weighted 24-hr composite
Total Recoverable Copper (mg/l)	N/A	0.54	N/L	0.013	1/discharge	Time-weighted 24-hr composite
pH (Std units)	6.0 - 8.5				1/discharge	Grab
Total Residual Chlorine [3] (mg/l)	No detectable				1/discharge	Grab*
The discharge shall be free from floating solids, sludge deposits, debris, oil and scum in other than trace amounts.						

(1) See Operation and Maintenance Part 2 Section B (Page 15)
(2) See Part III: Special Condition
(3) No chlorine shall be discharged in detectable amounts. The discharge of total residual chlorine shall not be greater than the non-detect level of less than 0.1mg/L.
* A grab sample be taken for Total Residual Chlorine which shall be sampled at the start of the discharge.

Table 6: Effluent Limitations and Monitoring Requirements – Second High Reservoir – Outfall 008

Discharge from Outfall 008 is dechlorinated potable water from the Second High Reservoir.

Parameter	Discharge Limitation				Monitoring Requirements	
	Mass Units (lbs/day)		Others		Sample Frequency	Sample Type
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily		
Flow (MGD)	N/A	N/A	N/A	N/L	1/discharge	Estimate
Total Suspended Solids [1] (mg/l)	N/A	N/A	30	60	1/discharge	Time-weighted 24-hr composite
Total Aluminum[2] (mg/l)	N/A	467	N/L	8.0	1/discharge	Time-weighted 24-hr composite
Total Nitrogen (mg/l)	N/L	N/L	N/L	N/L	1/discharge	Time-weighted 24-hr composite
Total Phosphorus (mg/l)	N/L	N/L	N/L	N/L	1/discharge	Time-weighted 24-hr composite
pH (Std units)	6.0 - 8.5				1/discharge	Grab
Total Residual Chlorine [3] (mg/l)	No detectable				1/discharge	Grab*
The discharge shall be free from floating solids, sludge deposits, debris, oil and scum in other than trace amounts.						

(1) See Operation and Maintenance Part 2 Section B (Page 15)
(2) See Part III: Special Condition
(3) No chlorine shall be discharged in detectable amounts. The discharge of total residual chlorine shall not be greater than the non-detect level of less than 0.1mg/L.
* A grab sample be taken for Total Residual Chlorine which shall be sampled at the start of the discharge.

Table 7: Effluent Limitations and Monitoring Requirements – Third High Reservoir – Outfall 009

Discharge from Outfall 009 is dechlorinated potable water from the Third High Reservoir.

Parameter	Discharge Limitation				Monitoring Requirements	
	Mass Units (lbs/day)		Others		Sample Frequency	Sample Type
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily		
Flow (MGD)	N/A	N/A	N/A	N/L	1/discharge	Estimate
Total Suspended Solids [1] (mg/l)	N/A	N/A	30	60	1/discharge	Time-weighted 24-hr composite
Total Aluminum[2] (mg/l)	N/A	667	N/L	8.0	1/discharge	Time-weighted 24-hr composite
Total Nitrogen (mg/l)	N/L	N/L	N/L	N/L	1/discharge	Time-weighted 24-hr composite
Total Phosphorus (mg/l)	N/L	N/L	N/L	N/L	1/discharge	Time-weighted 24-hr composite
pH (Std units)	6.0 - 8.5				1/discharge	Grab
Total Residual Chlorine [3] (mg/l)	No detectable				1/discharge	Grab*
The discharge shall be free from floating solids, sludge deposits, debris, oil and scum in other than trace amounts.						

(1) See Operation and Maintenance Part 2 Section B (Page 15)
(2) See Part III: Special Condition
(3) No chlorine shall be discharged in detectable amounts. The discharge of total residual chlorine shall not be greater than the non-detect level of less than 0.1mg/L
*A grab sample be taken for Total Residual Chlorine which shall be sampled at the start of the discharge.

II. Description of the Action Area

The action area is defined as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50 CFR Section 402.02). This includes the project's footprint as well as the area beyond it that may experience direct or indirect effects that would not occur but for the action.

The proposed permit authorizes discharges from seven outfalls numbered 002-004 and 006-009 as displayed in the image below (Outfall 002Q is a separate sampling point within Outfall 002). The action area spans approximately 11 river km from Little Falls Dam (rkm 189.4) downstream to Key Bridge (rkm 178.8).

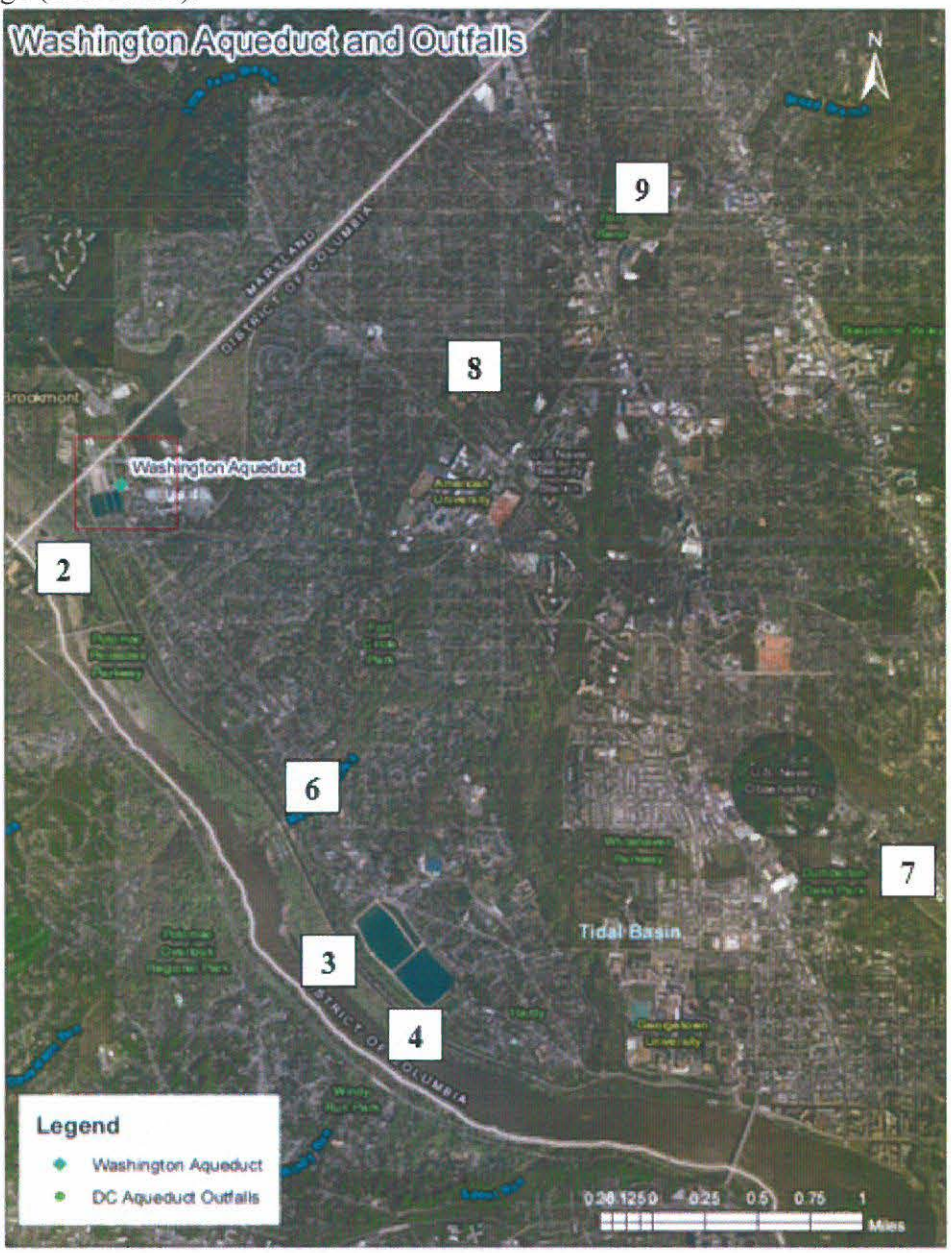

Figure 1: Washington Aqueduct Outfall map

The Dalecarlia Reservoir is a 46-acre earthen basin which serves as a pretreatment reservoir for the two water treatment plants. Approximately 51% of the untreated sediments, which are naturally occurring solids in the raw water taken from the Potomac River, are separated from the aqueous portion of the untreated water in the Dalecarlia Reservoir. These untreated sediments are high quality soil that is periodically removed from the reservoir and then land applied.

Water from the Dalecarlia Reservoir is delivered by gravity to both the Dalecarlia Water Treatment Plant (Dalecarlia sedimentation basins) and the Georgetown sedimentation basins, which are locally known as the Georgetown Reservoir. Water from the Georgetown sedimentation basins is delivered to the McMillan Water Treatment Plant.

Water from the Dalecarlia sedimentation basins is treated at the Dalecarlia Water Treatment Plant. Regardless of which plant processes the water, treatment is a three-step process which includes sedimentation, filtration and disinfection. The average production is 180 million gallons per day, however, during the summer the peak may approach 265 million gallons per day.

Water delivered to the sedimentation basins at Dalecarlia and the Georgetown sedimentation basins contains solids that did not physically settle out at the Dalecarlia Reservoir. To make the water drinkable, these solids must be chemically treated. The Corps does this by adding aluminum sulfate (alum), which is a widely used drinking water flocculent.

The Dalecarlia facility uses 36 rapid dual media filters and the McMillan facility is equipped with 12 rapid dual media filters. Except for the filter backwash water at the McMillan Water Treatment Plant which is recycled to the McMillan Reservoir, and the filter backwash water at the Dalecarlia Water Treatment Plant, which is recycled to the Dalecarlia Reservoir, all sedimentation residuals are collected in the Residual Processing Facility (Washington Aqueduct Draft Fact Sheet, 2018).

All sediments are now collected from the bottom of the sedimentation basins using a hose-less vacuum system (Dalecarlia Basins) or dredges (Georgetown Basin) and pumped to the Residual Processing Facility for thickening, dewatering and off-site disposal. This system ensures that no sediments are discharged back to the river. Discharges that are released through the outfalls going forward would be rainwater or partially treated drinking water and only occur two days every several years (Army Corp of Engineers- Shabir Choudhary, Email sent on October 11, 2018).

An analysis of the Potomac River's macroinvertebrate community characterized the community prior to and post discharge (Note: previous discharges were sediment heavy due to no residuals processing facility having been built). Substrate in the study area consists of boulders, bedrock and mud. Large bedrock formations were evident along the shoreline and also in mid-river where they are above the water surface during low tide. Softer sediments exist in patches between these rock substrate areas. Sediments are continually redistributed following medium to high river flow events (EPA, Biological Evaluation from 2008 Washington Aqueduct permit reissuance).

I. NMFS Listed Species (and Critical Habitat) in the Action Area

NMFS has identified the Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) and the Shortnose sturgeon (*Acipenser brevirostrum*) as the federally-listed endangered species in the proposed project area.

Federal Register citations and Species Recovery Plan citations for all listed species that are present in the action area

- Atlantic sturgeon (Acipenser oxyrinchus oxyrinchus)(77 FR 5880 and 77 FR 5914)
- Shortnose sturgeon (Acipenser brevirostrum)(32 FR 4001; Recovery plan: NMFS 1998)

Critical Habitat:

- Chesapeake Bay Critical Habitat Unit for Atlantic sturgeon (82 FR 39160). Final rule critical habitat Atlantic Sturgeon published 8/17/2017.

Atlantic Sturgeon

Atlantic sturgeon originating from the New York Bight, Chesapeake Bay, Carolina, and South Atlantic Distinct Population Segments (DPS) are listed as endangered, while those from the Gulf of Maine DPSs are listed as threatened (77 FR 5880 and 77 FR 5914; February 6, 2012). The Chesapeake Bay DPS, which includes areas of the Potomac and Anacostia Rivers in DC, was listed as endangered on February 6, 2012 (NOAA website). The marine range of all five DPSs extends along the Atlantic coast of North America from Canada to Cape Canaveral, Florida. Atlantic sturgeon spawn in their natal river, with spawning migrations generally occurring during February-March in southern systems, April-May in Mid-Atlantic systems, and May-July in Canadian systems (Murawski and Pacheco 1977; Smith 1985; Bain 1997; Smith and Clugston 1997; Caron et al. 2002).

Adults and sub-adults from all 5 DPSs of the Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), may occur within the area of the Potomac River where the Washington Aqueduct discharges to the Tidal Basin. The Atlantic sturgeon is an anadromous species, which means it only enters freshwater to spawn and spends the rest of its life in estuarine and marine waters. The species spawns in moderately flowing water (46-76 cm/s) in deep parts of large rivers. Eggs are adhesive and will attach to bottom substrate or hard surfaces. Once hatched, juveniles use benthic structures for refuge and will relocate to estuarine waters for months to years. Subadults and adults live in coastal waters and estuaries nearshore (shallow areas 10-50m depth). It is not uncommon for Atlantic sturgeon to migrate long distances from spawning rivers. Adults and subadults, and potentially eggs, larvae, young of year and juveniles (Chesapeake Bay DPS only) may be present within the Potomac River as spawning, rearing, and foraging all potentially occur. Three small juveniles and a large mature female have been captured in the Potomac River and due to the presence of features necessary to support reproduction and recruitment, the River potentially supports both spawning and rearing. Critical habitat has been designated within the Potomac River. All life stages are expected to be present in the vicinity of the discharges.

Shortnose Sturgeon

The shortnose sturgeon (*Acipenser brevirostrum*), which has been federally listed as endangered since March 11, 1967, is one of the species under NMFS's jurisdiction that may occur within the area where the Washington Aqueduct discharges to the Potomac River.

Shortnose sturgeon are known to have been present in the Potomac River historically; twelve have been captured since 1996, the most recent being in 2008. Between 2000 and 2005, USFWS's Atlantic Sturgeon Reward Program documented six individuals at the mouth of the Potomac River, one at the mouth of the St. Mary's River, one at the mouth of the Potomac Creek, and three individuals within the Potomac River (one at rkm 63, rkm 57 and rkm 48 respectively). A tagging and telemetry study depicted the range of shortnose sturgeon to extend from the Little Falls area to the confluence of the Potomac River with the Chesapeake Bay. The study, conducted by the U.S. Geological Survey (USGS) and USFWS, concluded in 2007. This study demonstrated that there was adequate habitat for shortnose sturgeon to forage, winter and spawn in the Potomac River. CART (combined acoustic and radio transmitting) tags were applied to two shortnose sturgeon during the study and one additional shortnose sturgeon in 2008 after the completion of the study. The fish tagged in 2008 has not been detected by telemetry array within the Potomac River; this suggests that the fish either shed the tag, left the Potomac, was caught or died.

Adult shortnose sturgeon have been documented in the Potomac River (Kynard et al. 1997; Kynard et al. 2009) up to the Little Falls Dam. Other life stages are assumed, but currently unknown. Spawning has historically occurred in the Potomac River, but current spawning is only assumed based on the presence of pre-spawning females and suitable habitat. Rearing is expected to occur in the Potomac due to the presence of eggs, which would presumably hatch and allow the larvae to be present downstream in freshwater. Foraging is assumed to occur mainly in the deepwater channel. Records for the Anacostia River and Rock Creek further suggest that habitats in these waterbodies and their tributaries are not consistent with the aquatic environment known to support shortnose sturgeon. According to NOAA's 2008 biological opinion issued for the Washington Aqueduct permit, historic reports indicate that shortnose sturgeon likely spawned in the vicinity of Little Falls. Therefore, all life stages are expected to be present in the vicinity of the discharge.

Critical Habitat

Critical habitat has been designated for the Atlantic sturgeon and was published in the Federal Register on August 17, 2017 (See 82 Fed. Reg. No. 158, pg. 39160-38274). The actions authorized by this permit overlap with critical habitat designations for the Atlantic sturgeon Chesapeake Bay DPS. The physical and biological features that contribute to the successful reproduction and recruitment of Atlantic sturgeon that occur in the action area include hard-bottom habitat in waters between 0-0.5 ppt salinity for spawning and the development of early life stages (PBF 1), the presence of a gradual downstream salinity gradient, soft substrate for spawning and juvenile foraging and physiological development (PBF 2), unimpeded movement (this includes appropriate water depths, flow) (PBF 3), and appropriate temperature, DO and salinity levels for various sturgeon life stages (PBF 4).

The conservation objective of critical habitat designation for the Atlantic sturgeon is to increase the abundance of each DPS by facilitating increased successful reproduction and recruitment to the marine environment (Guidance for Conducting an "NLAA" analysis – Atlantic sturgeon critical habitat, 10/2017).

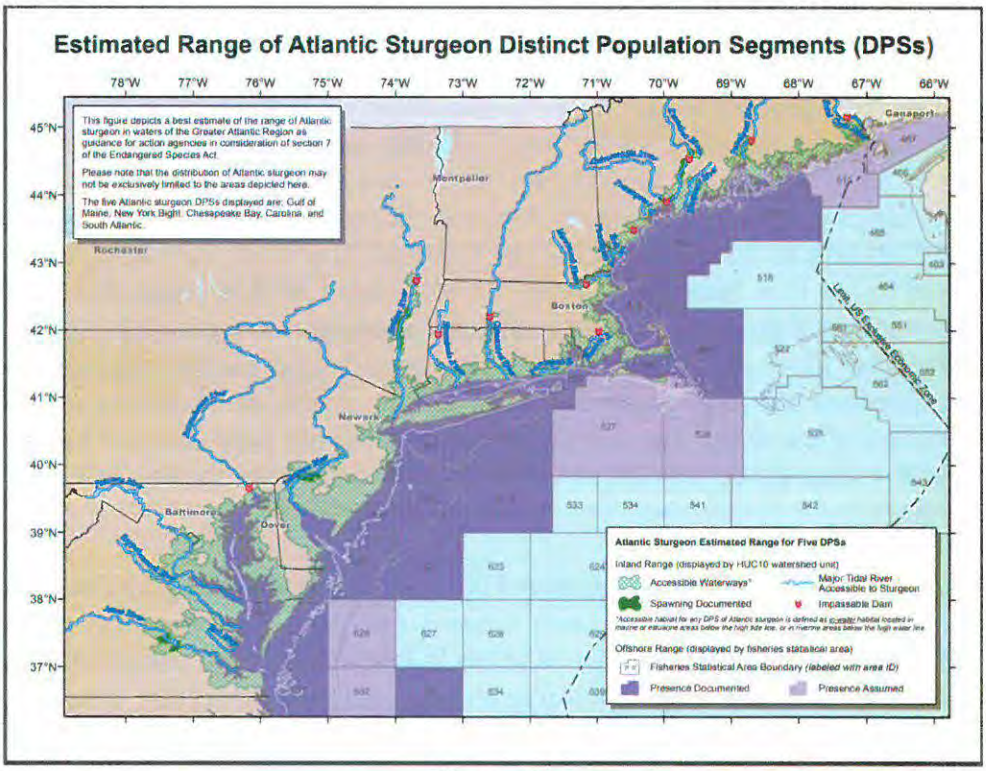

Figure 2:
(https://www.greateratlantic.fisheries.noaa.gov/protected/section7/guidance/maps/atlanticsturgeon.pdf.pdf)

Effects Determination

Water Quality

Historically, the main concern regarding the Washington Aqueduct discharges centered on total suspended solids and elevated aluminum concentrations. Outfalls 002, 003 and 004 discharge to the Potomac River. As no untreated discharges are expected to occur, this section will consider the effects of the treated water on sturgeon species and critical habitat present in the action area.

As noted in NOAA's 2010 biological opinion for the prior issuance of this permit, the discharge of residual solids and associated water from the basins during the spring spawning season could affect the movements and behaviors of adult sturgeon. This period proposedly takes place in the Potomac River between March and May/June when water temperatures are between 8 and 18 degrees Celsius with spawning adults expected between Little Falls Dam and Fletchers Landing (NOAA, 2010Biological Opinion for Washington Aqueduct).

Potential effects to all life stages of both species of sturgeon, and their behaviors (spawning, migrating, resting, foraging) from the Aqueduct includes alterations in flow rates and changes in ambient river temperature.

TSS

Studies in the past have suggested that concentrations of suspended solids can reach thousands of milligrams per liter before an acute toxic reaction is expected (NOAA, 2010 Biological Opinion). In the case of the Aqueduct, a main concern has been the deposition of sediment discharges onto eggs and larvae, reducing oxygen levels and potential smothering these sensitive life stages. Now that the Aqueduct has installed a residuals processing facility, no discharge of sediment occurs. As previously stated the only discharges occurring to the Potomac River would be those of rainwater or partially treated drinking water with a duration of two days occurring (if at all) every several years. The draft permit includes standard language for a bypass including additional terminology which prohibits any occurrence of a discharge of residuals during the spring sturgeon spawning season. All effluent is expected to be free of sediment and below pollutant background levels (i.e, meeting water quality standard thresholds for the waterbody), when discharged into the Potomac River, therefore any effects of TSS to the listed species are extremely unlikely to occur and are therefore discountable. §

Flow

Reported flow from the Corps for the Aqueduct indicates that for the past 5 years, only one discharge occurs yearly and that is from outfall 002Q (which is considered a leakage/discharge from a spring at Hydro building- groundwater) at a rate of 0.05 MGD. That flow equates to approximately 347 gallons/minute (PADEP, Millions of gallons calculator). There are no expected contaminants based on treatment chemicals in this discharge water.

Outfalls 002, 003 and 004 all discharge to the Potomac River and have maximum controlled daily flow of 7, 40 and 40 MGD respectively. These flows are expected to occur once every five years and be completely treated through the residuals processing facility, removing all suspended sediments.

As the disturbance to river conditions will not exceed two days and occur only once every five years for each outfall, the intermittent short-lived discharges of approximately 7 MGD for outfall 002 and 40 MGD for outfalls 003 and 004 will have minimal impacts on protected species in the action area and as such, any effects will be so small they cannot be detected and are therefore insignificant.

Toxic Effects of the Discharge

As noted in the 2010 biological opinion authored by NOAA for the previous issuance of this permit, the constituents of the discharge (except for aluminum and chlorine-which are added in the water treatment process) are not contaminants or pollutants but rather constituents of the raw river water (NOAA, Biological Opinion on Washington Aqueduct permit, 2010). This information from the previous biological opinion is incorporated by reference.

Aluminum

The toxicity of aluminum is known to be dependent on pH levels and surrounding environmental conditions. Dissolved aluminum is believed to be more toxic than total aluminum (NOAA, 2010 biological opinion on the Washington Aqueduct discharges). With the current permit limits, aluminum levels in the discharges should not exceed the effluent limits listed in Table 8 below.

The District of Columbia does not have numeric water quality criteria for aluminum, so when issuing permits, EPA interprets DC's narrative water quality criteria for toxics and issues a limit based on the most up-to-date science. Although EPA's aluminum criteria recommendation was last finalized in 1988, EPA issued Final Aquatic Life Ambient Water Quality Criteria for Aluminum in December 2018 (https://www.epa.gov/sites/production/files/2018-12/documents/aluminum-final-national-recommended-awqc.pdf). The new criteria recommendation uses site-specific data for pH, hardness, and dissolved organic carbon (DOC) to calculate a numeric aluminum criterion. The revised criteria may be more or less stringent than the 1988 criteria depending on these water quality factors (https://www.epa.gov/sites/production/files/2018-12/documents/aluminum-criteria-final-factsheet.pdf). For freshwater criteria, users can enter their site's water quality parameters into the Aluminum Criteria Calculator V2.0 (https://www.epa.gov/sites/production/files/2018-12/aluminum-criteria-calculator-v20.xlsm) or apply the lookup tables in the document's appendix. The resulting calculated acute criterion would have an appropriate level of protection if the one-hour average concentration is not exceeded more than once every three years on average. If the four-day average concentration is not exceeded more than once every three years on average, the calculated chronic criterion is protective of aquatic life, including endangered species.

Water Quality Standard Regulations do not contain water quality criteria for Aluminum. EPA developed WQBELs for Aluminum based on its interpretation of the District's narrative water quality criteria using EPA's aluminum criterion calculator as allowed in 40 C.F.R. § 122.44(d)(1)(vi)(A).

Table 8: Permit Effluent Limits For Aluminum

	Mass Units [lbs/day]		Others [mg/L]		Monitoring Requirements	
Outfall	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Sample Frequency	Sample Type
002	N/L	467.0	N/L	8.0	1/discharge	24-hr composite
002Q	N/L	3.3	N/L	8.0	1/quarter	Grab
003, 004	N/L	2669	N/L	8.0	1/discharge	24-hr composite
006	N/L	50	N/L	1.2	1/discharge	Time-weighted 24-hr composite
007	N/L	334	N/L	8.0	1/discharge	Time-weighted 24-hr composite
008	N/L	467	N/L	8.0	1/discharge	Time-weighted 24-hr composite
009	N/L	667	N/L	8.0	1/discharge	Time-weighted 24-hr composite

Studies suggest that the primary site of aluminum toxicity under acidic or alkaline conditions is the gill. The toxicity of aluminum appears to be lowest at a neutral pH with toxicity tending to increase with increasing or decreasing pH. The dissolved form of aluminum is believed to be more toxic than the total form of aluminum. Total aluminum concentrations for the Dalecarlia and Georgetown basins average 0.145 mg/L and 0.573 mg/L respectively. Recommended freshwater acute and chronic criteria were calculated for specific water chemistry conditions for aluminum in the Final Aquatic Life Ambient Water Quality Criteria for Aluminum 2018 and are displayed in Figure 3 below. These values are not recommended to be exceeded more than once every three years on average. During a typical 3.5 hour discharge event, these concentrations will exist in a small area for a very short period of time. Further, LC50 values for fish are based on a 96 hour continuous exposure to a given concentration in a laboratory, whereas exposure to elevated concentrations in the river during a discharge event are expected to last for a short period of time (four to twelve hours depending upon the size of the basin being discharged), and the flow of the river will also dilute any temporary and intermittent discharged. The laboratory experiment values are derived from dissolved aluminum whereas the aluminum in the discharge is the less toxic form measured as total aluminum (EPA, Washington Aqueduct RP, 2019) (NOAA, 2008 biological opinion on Washington Aqueduct).

Figure 3: Comparison of the 2018 Recommended Aluminum Aquatic Life AWQC and the 1988 Criteria

Version	Freshwater Acute[a] (1-hour, total aluminum)	Freshwater Chronic[a] (4-day, total aluminum)
2018 AWQC (vary as a function of a site's pH, DOC and total hardness)	1-4,800 µg/L	0.63-3,200 µg/L
1988 AWQC (pH 6.5 – 9.0, across all total hardness and DOC ranges)	750 µg/L	87 µg/L

[a] Values are recommended not to be exceeded more than once every three years on average.
Note: 2018 Criteria values will be different under differing water chemistry conditions as identified in this document, and can be calculated using the Aluminum Criteria Calculator V.2.0 (*Aluminum Criteria Calculator V.2.0.xlsm*) or found in the tables in Appendix K. See Appendix K for specific comparisons of 1988 and 2018 criteria values across water chemistry parameter ranges.

Toxicity testing indicated that the aluminum in effluent samples is not highly bioavailable or toxic (NOAA, Biological opinion on Washington Aqueduct permit, 2008). Therefore, toxic effects to all life stages of sturgeon species from the aluminum in the discharge is not expected beyond the immediate vicinity of Outfall 002 or 400 meters below Outfalls 003 or 004 and will have minimal impacts (if at all) on protected species in the action area because of the temporary nature, high dilution, and small area of discharge within the overall action area. As such, any effects will be so small they cannot be detected and are therefore insignificant.

Chlorine

The permit prohibits the discharge of chlorine in detectable amounts. While no studies have been conducted directly on sturgeon species to determine the toxicity of chlorine on sturgeon, there are studies that indicate toxic effects of chlorine on fish species in amounts as low as 28 µg/L up to 710 µg/L. As the draft permit does not allow chlorine to be discharged in detectable amounts, any effects to listed species would be extremely unlikely and therefore discountable.

Discharges from Outfalls 006-009

Discharges from Outfalls 006, 007, 008 and 009 are not associated with the cleaning of the Dalecarlia or Georgetown sedimentation basins. The fact sheet for the draft permit indicates that discharges from these outfalls will only occur once every 5 years for approximately 2 days (if at all) and are related to the cleaning and inspection of the Georgetown conduit, City Tunnel, Second High Reservoir and Third High Reservoir. These discharges flow to an unnamed tributary to the Potomac River (006), Rock Creek (007), and Mill Creek (008, 009). Between the time effluents are discharged and enter the Potomac River mainstem, dilution will have occurred.

NOAA noted in its last concurrence on this permit that adverse effects are expected for eggs and larvae at levels of 100 mg/L or greater of TSS. As the levels of TSS discharged from these Outfalls will be at levels less than 100 mg/L, they are expected to have undetectable and therefore, insignificant, effects on early life stages of sturgeon, if present. Juveniles, sub-adults, and adults would be extremely unlikely to be affected by those levels of TSS, and therefore any effects to those life stages are discountable. Additionally, these discharges will be highly diluted and intermittent nature of the discharges significantly reduces potential effects on the species.

Aluminum toxicity is discussed above. For all outfalls the draft aluminum criteria calculator was used. The District of Columbia WQS defined that the Criterion Continuous Concentration (chronic aquatic life criterion) is an extended period of time of 96 hours (4-day). Since the duration of the discharges are less than 96 hours and intermittent, EPA made the determination to use the acute criterion. As the CMC for aluminum is designated for the protection of aquatic life, it can be assumed that it will also be protective of all life stages of sturgeon. The potential for effects to sturgeon from the discharge of aluminum from all Outfalls 006-009 is decreased by the rarity of the discharge as well as the distance the effluent travels (several miles) and the consequent dilution that occurs before it reaches the Potomac River.The effects of aluminum discharged from Outfalls 006-009 are therefore too small to be detected and therefore insignificant.

A total recoverable copper limit was added to the draft permit for Outfall 007. Copper is an essential nutrient at low concentrations but is toxic to aquatic organisms at higher concentrations. Acute effects such as mortality exist while chronic effects include adverse effects on survival, growth, reproduction as well as alterations of brain function, enzyme activity, blood chemistry and metabolism (EPA, Aquatic Life Criteria-Copper). Copper levels in freshwater systems have been reported at levels of 0.20 to 30 µg/L and for locations receiving anthropogenic sources of copper have reported natural background levels of 100 micrograms/L or more (Aquatic Life Ambient Freshwater Quality Criteria – Copper, pg. 1, 2007). The draft permit includes limits for total recoverable copper of 0.023 mg/L prior to construction/pollution plan and 0.013 mg/L post construction/plan. These limits fall within the recognized range of expected background concentrations in freshwater systems. The potential for effects to sturgeon from the discharge of total recoverable copper from Outfall 007 is also decreased by the rarity of the discharge as well as the distance the effluent travels (several miles) and the consequent dilution that occurs before it reaches mainstem Potomac River where sturgeon are expected to be. The effects of total recoverable copper discharged from Outfall 007 are therefore too small to be detected and therefore insignificant.

Table 9: Discharge limitations for Outfalls 006-009 summarized from the draft permit

	Outfalls(s)	Maximum Daily	Average Monthly	Maximum Daily
TSS [mg/L]	006, 007, 008, 009	N/A	30	60
pH (Std units)	006, 007, 008, 009	6.0-8.5		
Total Residual Chlorine	006, 007, 008, 009	No detectable amounts		
Total Recoverable Copper [2] (mg/l) Interim Limit (Effective date to 3 years from effective date)	007	0.96 [lbs/day]	N/L	0.023 [mg/L]
Total Recoverable Copper [2] (mg/l) Interim Limit (3 years from effective date to expiration date)	007	0.54 [lbs/day]	N/L	0.013 [mg/L]
Aluminum [mg/L]	006	75.1	N/L	1.8

Overall, any effects on protected species in the action area from discharges from Outfalls 006-009 will be so small they cannot be detected and are therefore insignificant.

Effects of the Action - Critical Habitat

As discussed in detail in above, the designated critical habitat for the Atlantic sturgeon does fall within the action area for thi s permit. The physical or biological features (PBFs) that require special management considerations concerning any proposed action in the proposed critical habitat for the Atlantic sturgeon are listed and discussed below.

1) *"Hard bottom substrate (e.g. rock, cobble, gravel, limestone, boulder etc...) in low salinity waters (0.0-0.5 ppt) to allow for settlement of fertilized eggs, refuge, growth and development of early life stages."* The Potomac River at D.C. has levels of salinity that range from 0-0.5 ppt. As one moves downstream, salinity values increase due to influence from Chesapeake Bay tidal flows. As discussed, the action area contains area of boulders and cobbles that may be able to support spawning and the development of early life stages. However, the discharges into the portion of the action area (the mainstem Potomac River) will not contain any suspended sediments, all other water quality standards will be met, and no changes in salinity are expected. Since the substrate will not be affected by the discharge, and the low salinity levels will remain, any effects to the value of this PBF to the conservation of this species is extremely unlikely to occur, and therefore discountable.

2) *"A gradual downstream salinity gradient of 0.5-30 ppt with soft substrate (e.g. sand, mud) between the river mouth and spawning sites for juvenile foraging and physiological development."* At D.C., salinity levels in the Potomac are between 0 and 0.5 ppt, as discussed above; however as discharges dissipate further downstream, depending on flow conditions, they may overlap with areas that possess a salinity gradient between 0.5-30 ppt and where soft sediment habitat is present. Substrate will not be affected by the discharge, as TSS will not be a

factor in the discharges in the Potomac river, and the discharges will not affect the salinity in the water column because of the high dilution factor and intermittent and temporary nature of the discharges from the outfalls. Therefore, the discharges authorized by this permit will not change the salinity profiles of the receiving waters and substrates will not be affected, so any effects to the value of this PBF to the conservation of the species is extremely unlikely to occur, and therefore discountable.

3) "*Appropriate water depth and absent physical barriers to passage (e.g. locks, dams, thermal plumes, turbidity, sound, reservoirs, gear etc.) between the river mouth and spawning sites necessary to support unimpeded movement of adults to and from spawning sites, seasonal and physiologically dependent movement of juvenile Atlantic sturgeon to appropriate salinity zones within the river estuary and staging, resting or holding of subadults or spawning condition adults. Water depths must be deep enough (at least 1.2 m) to ensure continuous flow in the main channel at all times when any sturgeon life stage would be in the river.*" All discharges into the Potomac River portion of the action area where critical habitat has been designated are intermittent, temporary, and meet all water quality standards. As such, the quality and composition of the discharge will not impede sturgeon movement up or downstream because effluents will be blend to background levels rapidly. Additionally, because discharge plumes will not spread across the entire waterway, a zone of passage will always be available for sturgeon even when intermittent and temporary discharges occur. As the average flow of the Potomac around DC is 8 billion gallons per day, the intermittent, short-lived discharges authorized by this permit will have minimal impacts on critical habitat in the action area and as such, any effects to the value of PBF 3 to the conservation of the species will be so small they cannot be detected and are therefore insignificant.

4) "*Water between the river mouth and spawning sites, especially in the bottom meter of the water column, with the temperature salinity and oxygen values that, combined, support spawning, annual and interannual adult, subadult, larval and juvenile survival; larval, juvenile and subadult growth, development and recruitment (e.g. 13-26°C for spawning habitat and no more than 30°C for juvenile rearing habitat and 6.0 mg/L DO or greater for juvenile rearing habitat.*" The Potomac River around DC has high enough DO levels, appropriate temperature levels and salinity levels to accommodate Atlantic sturgeon spawning. Data indicates that PBF 4 is present in the action area. Because discharges authorized by the permit into the mainstem of the Potomac or into the small creeks that feed into the mainstem will not alter DO, temperature or salinity, any effects to the value of this PBF for the conservation of the species, will be extremely unlikely to occur, and discountable.

The actions authorized by this permit overlap with critical habitat designations for the Atlantic sturgeon Chesapeake Bay DPS. As the residuals processing facility is complete; no water quality excursions should occur. Included in the permit is a provision that no discharge of residuals shall be authorized during the spring spawning season (March 15-July 1); therefore no excursion in water quality from the authorized discharges should occur. Direct and indirect effects in the Potomac River (where Critical Habitat is designated) are therefore not expected, because no excursions above water quality standards should occur. The potential for effects to critical habitat from discharges authorized by this permit are also decreased by the rarity of the discharge as well as the distance the effluent travels (specifically -Outfalls 006-009) and the consequent

dilution that occurs before it reaches critical habitat. Therefore, discharges authorized by this permit should not adversely affect critical habitat for Atlantic sturgeon and all effects will be too small to be detected, and insignificant.

Conclusion

Based on the analysis that all effects of the proposed action will be insignificant and/or discountable, we have determined that the issuance of NPDES permit for the Washington Aqueduct is not likely to adversely affect any listed species and have no effect on critical habitat under NMFS's jurisdiction. We certify that we have used the best scientific and commercial data available to complete this analysis. We request your concurrence with this determination.

Sincerely,

Brian P. Trulear

Brian P. Trulear,
Chief Permits Section (3WD41)
Clean Water Branch
USEPA Region 3

Administrative Record

1. EPA, Washington Aqueduct Draft Permit, 2018
2. EPA, Washington Aqueduct Draft Fact Sheet, 2018
3. EPA, Final Biological Evaluation for Washington Aqueduct NPDES permit, April 18, 2008
4. NOAA, Biological Opinion for Washington Aqueduct, October 14, 2010
5. Army Corps of Engineers, Email from Shabir Choudhary to Valerie Lopez Carrasquillo, EPA, October 11, 2018.
6. NOAA, https://www.greateratlantic.fisheries.noaa.gov/protected/section7/guidance/maps/atlanticsturgeon.pdf.pdf
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13. EPA, Washington Aqueduct Reasonable Potential Analysis, 2019.