National Park Service
United States Department of the Interior

Environmental Assessment

The Arlington Memorial Bridge Rehabilitation

April 2016

Appendixes

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APPENDIX A: CONSULTATION LETTERS

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Virginia Ecological Services Field Office
6669 SHORT LANE
GLOUCESTER, VA 23061
PHONE: (804)693-6694 FAX: (804)693-9032
URL: www.fws.gov/northeast/virginiafield/

Consultation Code: 05E2VA00-2015-SLI-3362 February 19, 2016
Event Code: 05E2VA00-2016-E-01870
Project Name: Arlington Memorial Bridge Rehabilitation

Subject: Updated list of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). Any activity proposed on National Wildlife Refuge lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and

endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: Arlington Memorial Bridge Rehabilitation

Official Species List

Provided by:

Virginia Ecological Services Field Office
6669 SHORT LANE
GLOUCESTER, VA 23061
(804) 693-6694
http://www.fws.gov/northeast/virginiafield/

Expect additional Species list documents from the following office(s):

Chesapeake Bay Ecological Services Field Office
177 ADMIRAL COCHRANE DRIVE
ANNAPOLIS, MD 21401
(410) 573-4599

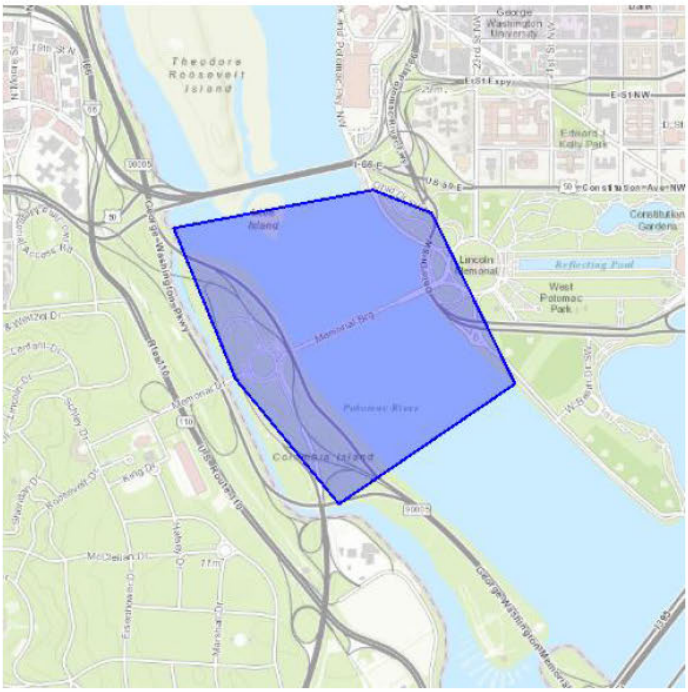
Consultation Code: 05E2VA00-2015-SLI-3362
Event Code: 05E2VA00-2016-E-01870

Project Type: BRIDGE CONSTRUCTION / MAINTENANCE

Project Name: Arlington Memorial Bridge Rehabilitation
Project Description: The proposed Arlington Memorial Bridge project includes rehabilitation or replacement of the bridgeâs bascule span (draw span); repairs to the deteriorated portions of the abutments, piers, and concrete arch approach spans; replacement of the concrete bridge deck; replacement of steel structural components under the bridgeâs sidewalks; improvements to the existing drainage system; and other nonstructural bridge improvements. Project plans involve reuse of all existing underwater components.

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.

Project Location Map:



Project Coordinates: MULTIPOLYGON (((-77.05488681793213 38.89200150079174, -77.05218315124512 38.8911664375226, -77.04836368560791 38.88505347544034, -77.05647468566895 38.88074402213866, -77.06128120422363 38.885253908767375, -77.06411361694336 38.89063199187812, -77.05488681793213 38.89200150079174)))

Project Counties: District of Columbia, DC | Arlington, VA

United States Department of Interior
Fish and Wildlife Service

Project name: Arlington Memorial Bridge Rehabilitation

Endangered Species Act Species List

There are a total of 0 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

There are no listed species identified for the vicinity of your project.

Critical habitats that lie within your project area

There are no critical habitats within your project area.

United States Department of Interior
Fish and Wildlife Service

Project name: Arlington Memorial Bridge Rehabilitation

Appendix A: FWS National Wildlife Refuges

There are no refuges within your project area.

Bran

United States Department of the Interior

NATIONAL PARK SERVICE
George Washington Memorial Parkway
c/o Turkey Run Park
McLean, Virginia 22101

June 18, 2015

Mr. Bryan King
District Department of Environment
Fish and Wildlife Division
1200 1st Street, NE 5th Floor
Washington, DC 20002

RE: Request for species of concern information for the rehabilitation of the Arlington Memorial Bridge, Washington, DC

Dear Mr. King:

The National Park Service (NPS), in cooperation with the Federal Highway Administration (FHWA), the U.S. Coast Guard, and the National Capital Planning Commission (NCPC), is proposing to rehabilitate the Arlington Memorial Bridge within the George Washington Memorial Parkway (GWMP), Washington, DC. The bridge spans the Potomac River, connecting the National Mall in Washington, DC with the Arlington National Cemetery in Virginia. The NPS is preparing an Environmental Assessment (EA) in accordance with the National Environmental Policy Act of 1969 (NEPA) to evaluate the potential environmental impacts of a range of alternatives to rehabilitate the bridge, which has deteriorated over time. Additional information on the project can be found on NPS's Planning, Environment and Public Comment (PEPC) website at http://parkplanning.nps.gov/projectHome.cfm?projectID=37120.

To comply with Section 7 of the Endangered Species Act, the NPS is requesting a review of the District of Columbia natural resources database to determine the potential for any plant or animal species of concern and/or any unique habitat that may occur in the project area. The NPS is aware of the potential for the federally listed endangered shortnose sturgeon (*Acipenser brevirostrum*) and Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) Chesapeake Bay Distinct Population Segment (DPS) to occur in the vicinity of the project area. The NPS has initiated coordination with the National Marine Fisheries Service regarding the sturgeon. However, the NPS requests your comments on this matter as well as any others that you feel are important for us to consider during this project.

Please submit your comments on the project to Mr. Steve Culver at 303-969-2054 or Steven_Culver@nps.gov. You may also contact Mr. Culver if you have any questions regarding the proposed project.

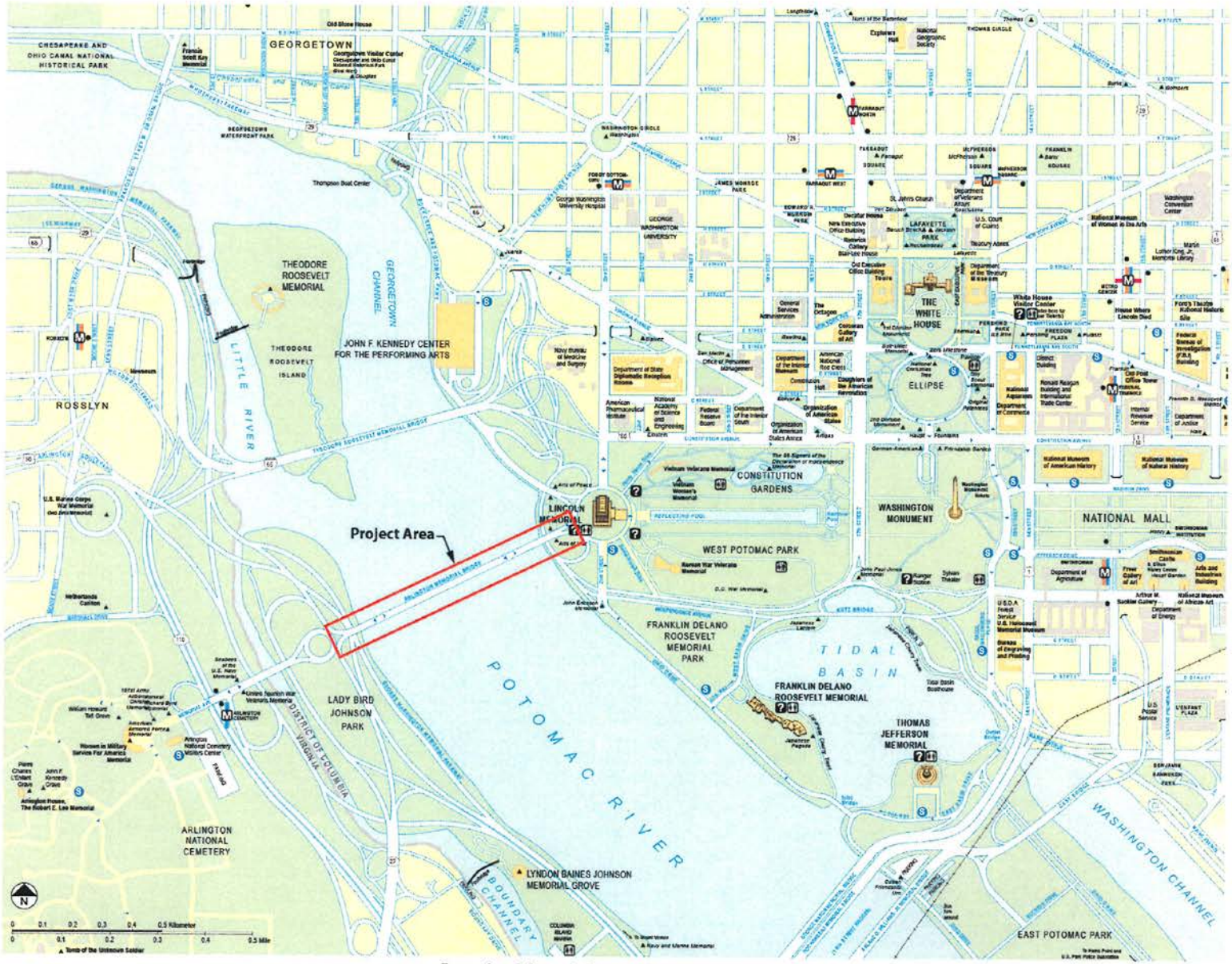
Sincerely,

Alexcy Romero

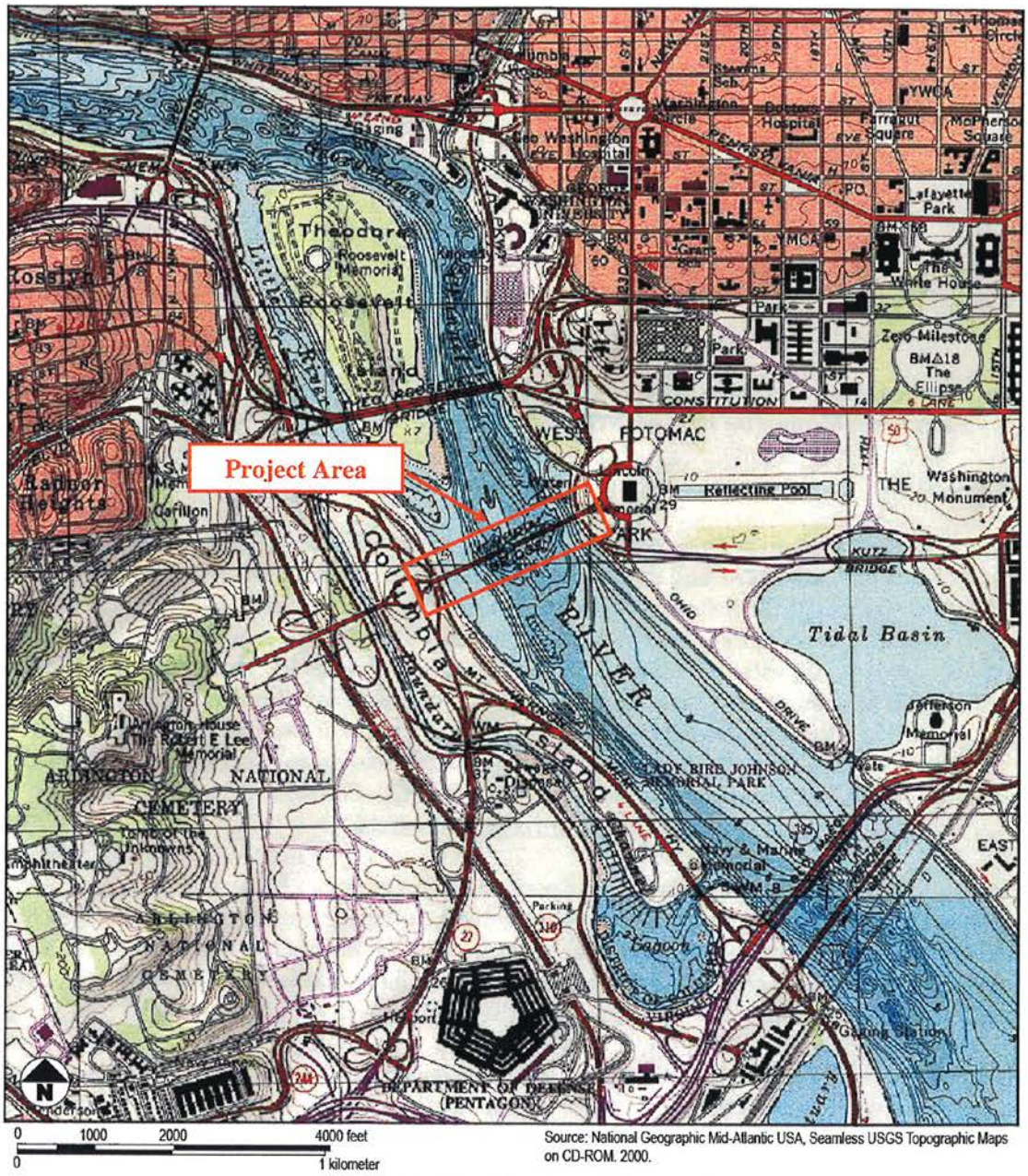
Mr. Alexcy Romero, Superintendent
George Washington Memorial Parkway
c/o Turkey Run Park
McLean, VA 22101
Alex_Romero@nps.gov

Enclosures: Topographic Map w/ Study Area (Washington West Quad)

cc: Joel Gorder, NPS National Capital Region
Karen Arey, NPS Denver Service Center
Joan Glynn, Stantec Consulting Services Inc.



Location Map: Arlington Memorial Bridge



Source: National Geographic Mid-Atlantic USA, Seamless USGS Topographic Maps on CD-ROM. 2000.

Topographic Map: Washington West Quad

GOVERNMENT OF THE DISTRICT OF COLUMBIA
Department of Energy and Environment

September 2, 2015

Mr. Steve Culver
National Park Service
George Washington Memorial Parkway
C/O Turkey Run Park
McLean, VA 22101

Re: Initiation of Section 7 Consultation and Request for Species and Habitat Information for Arlington Memorial Bridge Rehabilitation Project

Dear Mr. Culver:

Please note that our agency name has changed. The Department of Energy & Environment (DOEE or the Agency) has reviewed the National Park Service's request for information regarding the presence of rare, threatened, and endangered species that may be located in the area of its proposed Arlington Memorial Bridge Rehabilitation project. The response to this request is written below. Please be advised that this response is not an assessment of potential impacts, but merely a species account.

In response to this request DOEE finds that according to current observations, surveys, and data derived from the District's *Wildlife Action Plan*, the Agency's federally mandated blueprint for species conservation, the proposed project area does not harbor any species listed by the federal Endangered Species Act (ESA), any species classified by NatureServe as G1 (critically imperiled), any species classified by NatureServe as G2 (imperiled), nor any ecologically sensitive communities. Please monitor the project area regularly. Should any of these parameters change, please notify DOEE immediately. Additionally, this response does not characterize or quantify the presence of more common species that may be federally protected, nor species and habitats that may be considered important or valuable. Moreover, unless otherwise permitted by law, all District of Columbia and federal laws pertaining to fish and wildlife shall remain in effect for the duration of the project.

Finally, this correspondence in no way circumvents or nullifies any other permits or processes that may be required in connection with this project. For more information please contact me by phone at (202) 997-9607 or via email at bryan.king@dc.gov.

Sincerely,

Bryan D. King
Associate Director

INFORMATION SERVICES ORDER FORM 2014

Mail or Email to: Project Review Coordinator
Department of Conservation and Recreation
Natural Heritage Program
600 E. Main St., 24th Floor
Richmond, VA 23219
Voice: (804) 371-2708 Fax: (804) 371-2674
nhreview@dcr.virginia.gov

ENVIRONMENTAL REVIEW SERVICES:

- [X] **Project Review** (30 calendar day turnaround)..**$90 per site**; add **$35 for 1-5** natural heritage occurrences (rare plants, rare animals, significant communities and karst) and **$60 for 6** or more occurrences.
  Multi-quad project area **$90 per quad**.
- [ ] **Project Review with Accompanying Map...$250 per site;** for projects with potential impact to Natural Heritage Resources including alternative energy projects, written comments with 8.5 X 11 map displaying Natural Heritage Screening Coverage.
- [ ] **Priority Service** (5 business day turnaround)..**$500 surcharge**

Details: Describe project in the space below, please include detailed project description, project location information including **latitude, longitude,** acreage, and existing site conditions (photographs if available). Attach additional information as necessary. In order to ensure an accurate assessement, please submit **an electronic copy of a site map** (preferably from a USGS topo map with identified project boundaries) and all other information to **nhreview@dcr.virginia.gov** or fax a map to: **Environmental Review Coordinator @(804) 371-2674**. Please include the project title on all correspondence. **Incomplete submittal of information will delay the review process.**

Project Number & Title: Rehabilitation of the Arlington Memorial Bridge

Project Description: Arlington Memorial Bridge is located at 38.887198 Latitude, -77.055945 Longitude

The National Park Service (NPS) is proposing to rehabilitate the Arlington Memorial Bridge within the George Washington Memorial Parkway (GWMP), Washington, DC. The bridge spans the Potomac River, connecting the National Mall in Washington, DC with the Arlington National Cemetery in Virginia. The NPS is preparing an Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA) to evaluate the potential environmental impacts of a range of alternatives to rehabilitate the bridge, which has deteriorated over time. The proposed project includes the rehabilitation or replacement of the steel draw span (technically referred to as bascule span); repairs to the deteriorated portions of the abutments, piers, and concrete arch approach spans; replacement of the concrete bridge deck; resurfacing the travel lanes; replacement of steel structural components under the sidewalks; replacement of the concrete sidewalks and refitting of granite curbs; repairs to granite bridge railings as needed; and other minor nonstructural bridge improvements.

The project will require construction staging on lands surrounding the bridge, in Virginia and the District, and on the Potomac River. Barges would be used during construction. Dredging would be necessary within the Potomac River to provide sufficient water depths for the barges. Also, cofferdams would be installed to dewater around the bridge piers to allow for repairs to occur.

DCR
Virginia Department of Conservation & Recreation

INFORMATION SERVICES ORDER FORM 2014

Natural Heritage Resource Reports & Distribution Maps

☐ **Custom NHR Maps (describe, call for more information).....$80/hour**

☐ **Custom NHR Reports (describe, call for more information).....$60/hour**

SUBSCRIPTION SERVICES: Hyperlink to an example of the license agreement

Natural Heritage Data Explorer Subscription Service

☐ (unlimited access per subscription year, complete a digital license agreement is required).....**$1000/yr**.

Digital Conservation Sites Subscription Service (specify area of interest, complete a digital license agreement is required)

☐ 1 county or 12 quads or less.....**$1000/yr.**

☐ 13-100 quads.....**$3500/yr.**

☐ Statewide coverage.....**$6000/yr.**

Please provide details in the space below: **(failure to provide information will delay subscription processing)**

Conditions:

1. Digitized DCR natural heritage resource locational data for GIS or map production, whether provided by DCR digitally or entered by the client from tables or reports, may not be used without first completing a data licensing agreement with DCR Division of Natural Heritage. A license form is available on request.

2. Although DCR-DNH data are closely quality controlled, DCR-DNH makes no warranty as to the fitness of the data for any purpose.

3. Any publication of data provided by DCR, whether as text, table or map, must acknowledge Virginia DCR-Natural Heritage Program, and include the date the data were provided by DCR.

4. If fees are assessed, an invoice will be included with the response. **Please do not pre-pay.** Payment is due within 30 days of receipt. **Minimum charge for hourly fees is $40.**

I understand and agree to the above conditions: ☐ Yes (Required for Fee Services)

 Rehabilitation of the Arlington Memorial Bridge

DCR
Virginia Department of Conservation & Recreation

INFORMATION SERVICES ORDER FORM
2014

INFORMATION SERVICES ORDER FORM

DCR maintains lists of natural heritage resources monitored by the Natural Heritage Program. These lists provide information on taxonomy, rarity and federal/state legal statuses. These reports are not site specific and are **NOT** to be substituted for a project review or for on-site surveys required for environmental assessments of specific project areas.

Due to staff and budget constraints we ask that you use the online service whenever possible to download these lists of natural heritage resources:

Hyperlink to on-line reports (these may change as they are updated by inventory staff)

The Natural Communities of Virginia

☐ **Natural Heritage Resources of Virginia: Rare Animals (PDF)**

☐ **Natural Heritage Resources of Virginia: Rare Plants (PDF)**

County lists of natural heritage resources can be generated using the Natural Heritage Data Explorer:

Or requested below :

Send data and invoice (if applicable) to: (Please be sure to include a phone number and e-mail so we may contact you if we have any questions regarding your data needs)

Name: Mr. Steve Culver

Company: National Park Service – Denver Service Center

Address: 12795 West Alameda Parkway **City:** Denver

State/Zip: CO, 80225-0287 **Taxpayer ID #:** **Fax:**

Phone: 303-969-2054 **Ext:** **Email:** Steven_Culver@nps.gov

Molly Joseph Ward
Secretary of Natural Resources

Clyde E. Cristman
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

Joe Elton
Deputy Director of Operations

Rochelle Altholz
Deputy Director of Administration and Finance

David Dowling
Deputy Director of Soil and Water and Dam Safety

August 7, 2015

Steven Culver
National Park Service
George Washington Memorial Parkway
c/o Turkey Run Park
McLean, VA 22101

Re: Arlington Memorial Bridge Rehabilitation

Dear Mr. Culver:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

Biotics documents the presence of natural heritage resources within two miles of the project area. However, due to the scope of the activity and the distance to the resources, we do not anticipate that this project will adversely impact these natural heritage resources.

According to DCR staff biologists there is the potential for the Northern Long-eared bat (*Myotis septentrionalis, G1G3/S3/LT/NL*) to occur within the project area. The Northern Long-eared bat is a small insect-eating bat characterized by its long-rounded ears that when folded forward extend beyond the tip of the nose. Hibernation occurs in caves, mines and tunnels from late fall through early spring and bats occupy summer roosts comprised of older trees including single and multiple tree-fall gaps, standing snags and woody debris. Threats include white nose syndrome and loss of hibernacula, maternity roosts and foraging habitat (NatureServe, 2014). Due to the decline in population numbers, the Northern Long-eared bat has been federally listed as "threatened" by the United States Fish and Wildlife Service (USFWS).

DCR recommends coordination with the USFWS regarding potential impacts upon federally threatened Northern long-eared bats associated with tree removal.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

New and updated information is continually added to Biotics. Please re-submit project information and map for an update on this natural heritage information if the scope of the project changes and/or six months has passed before it is utilized.

The Virginia Department of Game and Inland Fisheries (VDGIF) maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from http://vafwis.org/fwis/ or contact Ernie Aschenbach at (804-367-2733) or Ernie.Aschenbach@dgif.virginia.gov.

Should you have any questions or concerns, feel free to contact me at 804-692-0984. Thank you for the opportunity to comment on this project.

Sincerely,

Alli Baird

Alli Baird, LA, ASLA
Coastal Zone Locality Liaison

Cc: Troy Andersen, USFWS

Literature Cited

NatureServe, 2014. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe. Arlington, Virginia. Available http://explorer.natureserve.org (Accessed: December 22, 2014).

United States Department of the Interior

NATIONAL PARK SERVICE
George Washington Memorial Parkway
c/o Turkey Run Park
McLean, Virginia 22101

June 18, 2015

Kim Damon-Randall
Assistant Regional Administrator
National Marine Fisheries Service
Northeast Region
55 Great Republic Drive
Gloucester, MA 01930-2276

RE: Informal Section 7 Consultation for Rehabilitation of the Arlington Memorial Bridge, Washington DC

Dear Ms. Damon-Randall:

The National Park Service (NPS), in cooperation with the Federal Highway Administration (FHWA), the U.S. Coast Guard, and the National Capital Planning Commission (NCPC), is proposing to rehabilitate the Arlington Memorial Bridge. The Arlington Memorial Bridge spans the Potomac River between the National Mall in Washington, DC, and the Arlington National Cemetery in Virginia. Currently, the NPS is preparing an Environmental Assessment (EA), in accordance with the National Environmental Policy Act (NEPA), to analyze the potential environmental impacts that would result from implementation of the proposed project. The purpose of this correspondence is to initiate informal consultation in accordance with Section 7 of the Endangered Species Act of 1973, as amended.

Description of the Proposed Action

The Arlington Memorial Bridge is more than 80 years old and has not undergone a major rehabilitation in many years. Several temporary repairs have kept it operational to meet the needs of the traveling public. However, like many other older highway bridges across the nation, the bridge needs comprehensive repair to ensure its ability to provide adequate traffic service for decades to come. Annual bridge inspections have identified the elements of the bridge in need of repair. The proposed Arlington Memorial Bridge project includes rehabilitation or replacement of the bridge's bascule span (draw span); repairs to the deteriorated portions of the abutments, piers, and concrete arch approach spans; replacement of the concrete bridge deck; replacement of steel structural components under the bridge's sidewalks; improvements to the existing drainage system; and other nonstructural bridge improvements. Project plans involve reuse of all existing underwater components. Additional information on the project can be found on

NPS's Planning, Environment and Public Comment (PEPC) website at http://parkplanning.nps.gov/projectHome.cfm?projectID=37120.

Federal Species of Concern

Initial project coordination with Ms. Christine Vaccaro, Fishery Biologist for the National Marine Fisheries Service (NMFS), Protected Resources Division, occurred on November 6, 2012. Ms. Vaccaro indicated that the federally listed endangered shortnose sturgeon (*Acipenser brevirotrum*), and the Chesapeake Bay Distinct Population Segments (DPS) of the Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), are known to occur in the Potomac River. Ms. Vaccaro provided the NPS with valuable technical assistance and species information that helped the team to identify appropriate conservation measures to avoid and/or minimize impacts to the shortnose and Atlantic sturgeon during the proposed rehabilitation of the Arlington Memorial Bridge.

Atlantic Sturgeon

The Atlantic sturgeon Chesapeake Bay DPS was listed as endangered on February 6, 2012. Numbers of the Atlantic sturgeon in the Chesapeake Bay are extremely low compared to historical levels. Only one known spawning population of the species exists in the region, in the James River[1]. Recent sightings of the Atlantic sturgeon in the Potomac River date back to 1970, where one large mature female was documented by the Maryland Department of Natural Resources[2]. Historic spawning habitat is thought to exist in the Potomac River, and Atlantic sturgeon has been recorded in the Potomac River in recent years. No critical habitat has been designated for Atlantic sturgeon.

The Atlantic sturgeon is a long-lived, estuarine dependent, anadromous fish species. Atlantic sturgeon can grow to approximately 14 feet long and can weigh up to 800 lbs. Atlantic sturgeon are benthic feeders and typically forage on benthic invertebrates (e.g. crustaceans, worms, mollusks). Spawning adults migrate upriver in spring, beginning in April-May in the mid-Atlantic. In some southern areas, a small spawning migration may also occur in the fall. Spawning occurs in flowing water between the salt front and fall line of large rivers. Following spawning, males may remain in the river or lower estuary until fall; females typically exit the rivers within four to six weeks. Juveniles move downstream and inhabit brackish waters for a few months and when they reach a size of about 30 to 36 inches (76-92 cm) they move into near shore coastal waters. Tagging data indicate that these immature Atlantic sturgeons travel widely once they emigrate from their natal (birth) rivers[3].

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[1] http://www.nmfs.noaa.gov/pr/pdfs/species/atlanticsturgeon_chesapeakebay_dps.pdf
[2] http://www.nero.noaa.gov/prot_res/CandidateSpeciesProgram/AtlSturgeonStatusReviewReport.pdf
[3] http://www.nmfs.noaa.gov/pr/species/fish/atlanticsturgeon.htm

Shortnose Sturgeon

The shortnose sturgeon was listed as endangered in 1967 and was included on the endangered species list in 1973 when the Endangered Species Act of 1973 was enacted. Threats to the species at the time of listing included pollution, habitat loss, and overharvesting (NMFS 1998). No critical habitat has been designated for shortnose sturgeon.

Shortnose sturgeon resembles Atlantic sturgeon on a smaller scale. Adult shortnose sturgeons have a blunt snout, which differentiates it from the elongated snout of the Atlantic sturgeon. Shortnose sturgeon can reach lengths of 4.7 feet and weigh up to 50.7 pounds. The lifespan of the species is typically 30 years, but can last up to 67 years[4]. Like the Atlantic sturgeon, the shortnose sturgeon is a benthic feeder, eating aquatic insects, amphipods, isopods, shrimp, and mollusks. In contrast with the Atlantic sturgeon, the shortnose sturgeon prefers near shore marine, estuarine, and riverine habitats and typically spends most of its life in the lower reaches of rivers. During spawning, they migrate upstream to cooler, faster-moving waters. Shortnose sturgeons are rarely found in ocean areas, and rarely stray from their native rivers[5]. Shortnose sturgeon are typically found in the deepest areas of the Potomac River (i.e., greater than 3 meters) with suitable dissolved oxygen (i.e., greater than 5 parts per million); often this type of habitat occurs in deepwater navigation channels. While foraging, shortnose sturgeon can also be found in shallower water over mudflats of shellfish beds. Kynard et al. found shortnose sturgeon were largely restricted to the deep water channel as forage items in shallower areas were limited[6].

Recent studies to determine the status of the shortnose sturgeon in the Potomac River include a three year field study (2004-2007) conducted for the National Park Service. The study was conducted for a 100 km length of the Potomac River from the Little Falls Dam just north of Washington, DC to the Port Tobacco River. Sampling was performed using gill nets and resulted in the capture of two adults. Tagging and tracking of the fish (September 2005 through June 2007) by U.S. Geological Survey indicated that both sturgeon stayed within the Potomac River near Mattawoman Creek. Pre-spawning females came up to the area below Little Falls Dam during spring spawning migration, approximately 11 km upstream from the project area[7]. Based on studies conducted by Kynard et.al., suitable spawning habitat was identified in the Potomac River downstream of Little Falls Dam and in the Fletcher's Boat House (rkm 184.5)-Chain Bridge (rkm 187) reach. Based on information provided by the NMFS, at least one radio-tagged female shortnose sturgeon was tracked upstream to Little Falls in the Potomac River in 2006[8].

Correspondence from NMFS reveals that twelve shortnose sturgeon have been captured in the Potomac River since 1996. The captures from the shortnose sturgeon U.S. Fish and Wildlife Service reward program were documented in the following locations: six at the mouth of the

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[4] http://www.nmfs.noaa.gov/pr/species/fish/shortnosesturgeon.htm
[5] http://www.dnr.state.md.us/wildlife/Plants_Wildlife/rte/rtesnsturgeon.asp
[6] Final Report Status of Shortnose Sturgeon in the Potomac River, Kynard et.al 2007
[7] Final Report Status of Shortnose Sturgeon in the Potomac River, Kynard et.al 2007
[8] Ronald Reagan Washington National Airport Final EA, MWAA 2012

Potomac River; one at the mouth of the St. Mary's River; one at the mouth of Potomac Creek; one at river kilometer 63, one at river kilometer 57 (Cobb Bar); one at river kilometer 48; and U.S. Geological Survey caught one at river kilometer 103. Based on this information, the nearest capture was approximately 60 river kilometers downstream of the Arlington Memorial Bridge. However, because there were only two adult females captured during the three-year study period, it was determined that the abundance of the shortnose sturgeon in the Potomac River is lower than other rivers with reproducing populations[9].

Impacts of the Proposed Action

Rehabilitation of the Arlington Memorial Bridge may result in temporary impacts to water quality and aquatic habitat. In order to avoid or minimize impacts to the extent possible, project plans would include conservation and mitigation measures to reduce impacts associated with dredging, cofferdam installation, disturbances to river bottom habitat, and disturbances to the water column. The following describes construction activities that would likely occur to complete the bridge rehabilitation and conservation measures intended to mitigate impacts to the shortnose and Atlantic sturgeon.

- The life history of the shortnose sturgeon suggests that young-of-the-year sturgeon within the Potomac River could potentially be present in the project action area from February 15 to July 1 of any year. Time-of-year restrictions on rehabilitation activities (cofferdam installation and pier rehabilitation) would be used so that these activities will occur outside of the likely period of sturgeon occurrence. This time period will also satisfy District Department of Health and District Department of the Environment time-of-year restrictions to protect spawning anadromous fishes in general and would protect any potential spawning/migrating adult sturgeon within the project area. Therefore, the NPS would restrict in-stream construction work from February 15 to July 1 to avoid potential impacts to spawning/migrating anadromous fishes, including the shortnose and Atlantic sturgeon.

- Construction activities would require the use of barges to transport materials to and from the bridge. Dredging of the Potomac River would be necessary to provide sufficient water depths for the barges to access the bridge from construction staging areas along the shoreline. In order to minimize potential effects on the sturgeon during construction, no dredging would be conducted from February 15 through July 1 to protect spawning/migrating anadromous fishes. Also, to minimize temporary impacts to water quality, turbidity curtains would be placed around dredge areas to prevent sediment migration, and active monitoring of the curtains would take place to ensure proper function. It is anticipated that turbidity curtains for dredging would only be needed near the shoreline, where the majority of dredging would occur, and would not block the deeper channels at the middle of the river. Turbidity curtains for dredging activities

[9] http://www.fws.gov/northeast/marylandfisheries/reports/shortnose_fact_sheet_7_21_09.pdf

would be removed after dredging has concluded. Due to the implementation of the above mitigation measures, dredging activities and the use of barges during construction are not likely to adversely affect individual sturgeon, their habitat, or their ability to migrate through the project area during construction.

- Rehabilitation of the bridge abutments and piers beneath the water line would take place "in-the-dry." Methods to obtain dry work conditions are expected to involve traditional cofferdams. In order to minimize potential effects on the sturgeon during construction, turbidity curtains would be placed around the bridge piers where cofferdams would be installed in order to limit migration of channel bottom sediments and reduce turbidity. Pier rehabilitation would occur in phases, with only a few piers under construction at any given time; therefore, turbidity curtains would not completely obstruct the river. Turbidity curtains would be removed after the cofferdams are installed. Also, cofferdam installation would be conducted outside the February 15 through July 1 in-stream restriction period. As a result, cofferdam installation is not likely to adversely affect individual sturgeon, their habitat, or their ability to migrate through the project area during construction.

- Based on an analysis of past steel sheet pile driving activities, effects of increased underwater noise will be experienced only within approximately 10 meters of the piles being driven (previous NMFS informal consultation) during cofferdam installation. Piles driven for cofferdams would be smaller than the 66-inch diameter piles that are known to cause fish kills. Cofferdam installation would be conducted outside the February 15 through July 1 in-stream restriction period; therefore, it is not likely that individual sturgeon would be exposed to increased levels of underwater noise resulting from the installation of the steel sheet piles that will compose the cofferdams.

- Repairs to the deteriorated portions of the bridge decking, abutments, piers, and approach spans above the water line would be performed with debris shields in order to prevent materials from falling into the waterway during rehabilitation. Accidental spillage or dumping during bridge rehabilitation would be prevented, which would help to maintain existing water quality and would therefore result in no impacts to sturgeon or sturgeon habitat.

Cumulative Effects

Other projects along the Potomac River such as the proposed expansion of the Kennedy Center, the anticipated rehabilitation of the Theodore Roosevelt Memorial Bridge (I-66/US-50), and the proposed DC Clean Rivers Project Potomac River Tunnel, would require coordination with NMFS to ensure that appropriate conservation measures are implemented to avoid or minimize project impacts to shortnose and Atlantic sturgeon. During construction, these projects, along with the Arlington Memorial Bridge rehabilitation, would adhere to time-of-year restrictions as

required by the District Department of Health and District Department of the Environment and would implement best management practices to minimize impacts to water quality and aquatic habitat to the extent possible. Therefore, it is not likely that adverse cumulative effects to the federally endangered shortnose or Atlantic sturgeon would result if effective conservation measures are implemented.

Conclusion

The NPS, in cooperation with FHWA, the U.S. Coast Guard, and NCPC, is proposing to rehabilitate the Arlington Memorial Bridge. The NPS is preparing an Environmental Assessment in accordance with NEPA to analyze the potential environmental impacts of the proposed project. The project includes rehabilitation or replacement of the bridge's bascule span (draw span); repairs to the deteriorated portions of the abutments, piers, and concrete arch approach spans; replacement of the concrete bridge deck; replacement of steel structural components under the bridge's sidewalks; improvements to the existing drainage system; and other nonstructural bridge improvements. Project plans involve reuse of all existing underwater components.

There are records of shortnose sturgeon and Atlantic sturgeon occurrences in the Potomac River. At least two shortnose sturgeons, in 2006 and 2008, were tracked to Little Falls meaning that these individuals passed through or temporarily occurred within the project area. No Atlantic sturgeons have been documented in the project area, but individuals have been documented in the Potomac River.

Proposed conservation measures during the rehabilitation of the Arlington Memorial Bridge consist primarily of the adherence to time-of-year restrictions for in-stream construction activities, such as dredging and the installation of cofferdams. The placement of turbidity curtains would occur around dredge areas and where cofferdams are installed in the river bottom. Turbidity curtains would prevent sturgeon from entering the active construction area in the event that they are present in the project vicinity during construction, and prevent suspended sediments from leaving the project site. Construction activities associated with the rehabilitation of the bridge above the water line will not cause harm to sturgeons that may be in the vicinity. Based on the unlikely potential for occurrence of sturgeon in the project area during construction, the nature of the proposed activities, and the implementation of conservation measures to exclude sturgeons from the project area based on the best available scientific and commercial data and professional judgment, the NPS concludes that the rehabilitation of the Arlington Memorial Bridge is not likely to adversely affect the federally endangered shortnose or Atlantic sturgeon.

The NPS has determined that any adverse effects from the proposed action, with appropriate mitigation measures implemented, would be insignificant or discountable. Therefore, the NPS has determined this project is not likely to adversely affect either the shortnose or Atlantic sturgeon. The NPS requests concurrence from NOAA Fisheries with this determination.

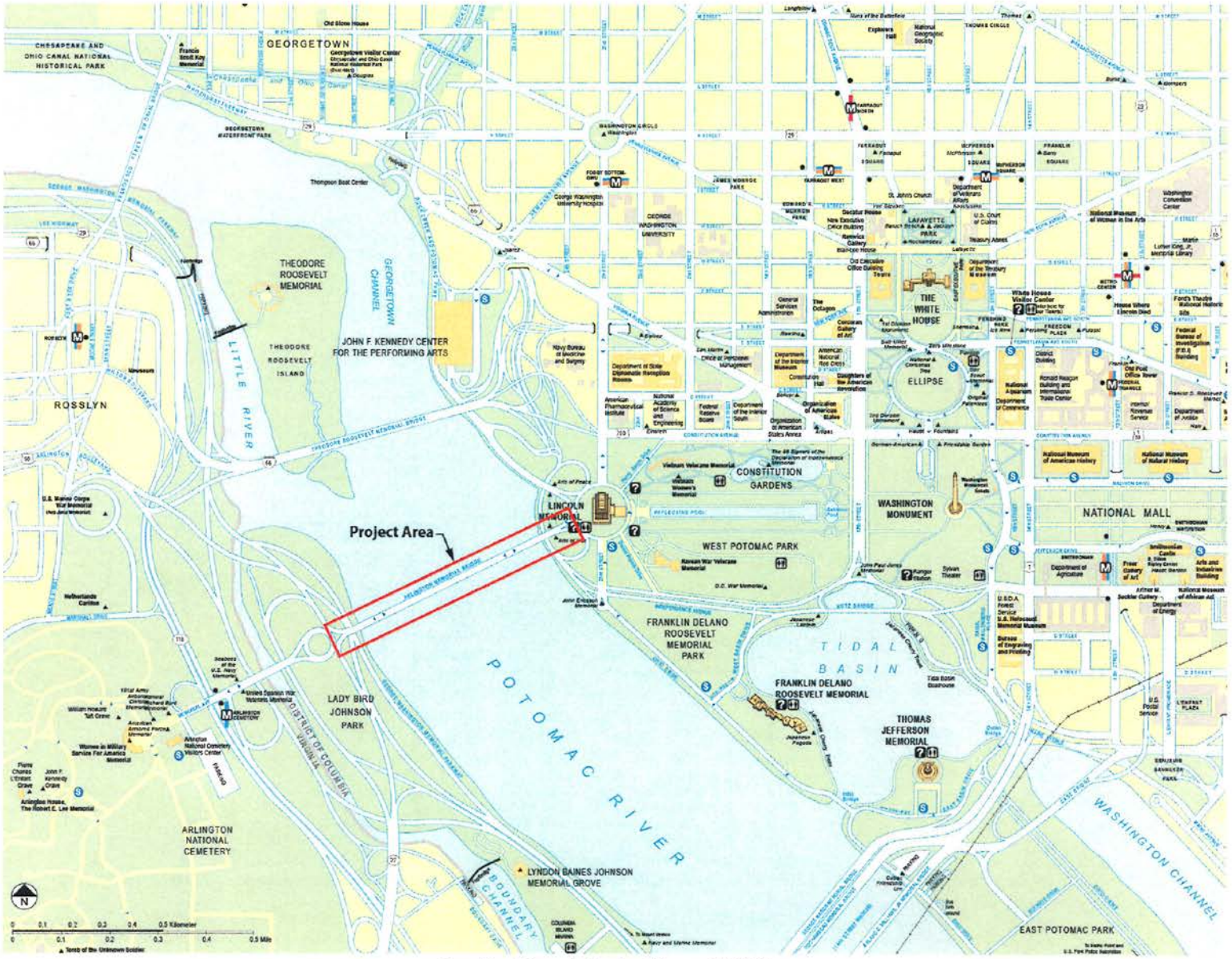
If you have any questions regarding this project or need additional information prior to making your determination, please feel free to contact Mr. Steve Culver at 303-969-2054 or Steven_Culver@nps.gov.

Sincerely,

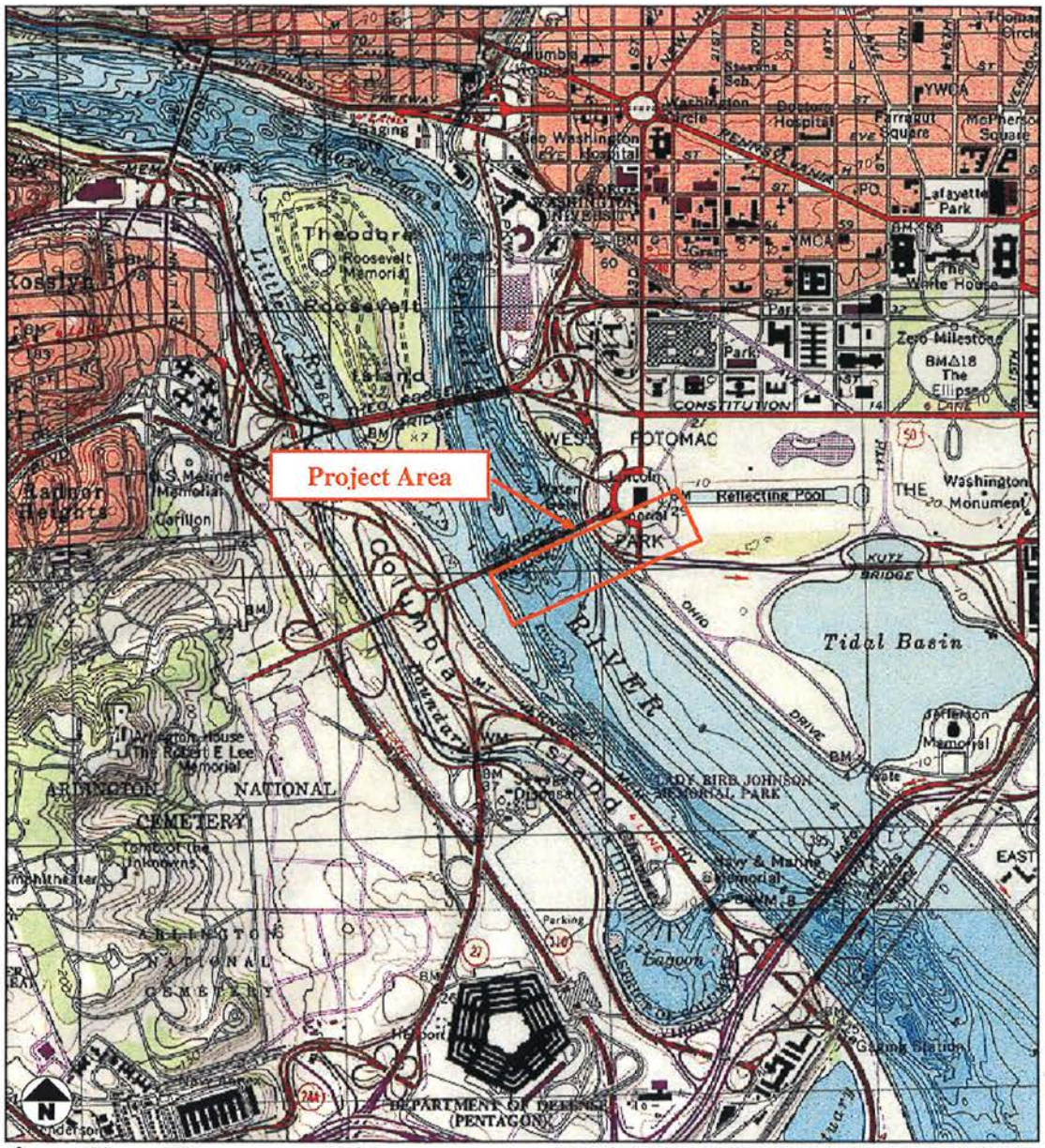
Mr. Alexcy Romero, Superintendent
George Washington Memorial Parkway
c/o Turkey Run Park
McLean, VA 22101
Alex_Romero@nps.gov

Enclosures: Project Location Map

cc: Ms. Julie Crocker, NOAA
Joel Gorder, NPS National Capital Region
Karen Arey, NPS Denver Service Center
Joan Glynn, Stantec Consulting Services Inc.
Project File



Location Map: Arlington Memorial Bridge



Topographic Map: Washington West Quad

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930-2276

OCT 15 2015

Alexcy Romero
Superintendent
National Park Service
George Washington Memorial Parkway
c/o Turkey Run Park
McLean, Virginia 22101

Re: Rehabilitation of Arlington Memorial Bridge

Dear Mr. Romero:

We have completed an Endangered Species Act (ESA) section 7 consultation in response to your letter of June 29, 2015, and additional information received on September 1 and October 6, 2015. We concur with your determination that the proposed project is not likely to adversely affect any species listed by us as threatened or endangered under the ESA of 1973, as amended. Our supporting analysis is provided below.

Proposed Project
The National Park Service (NPS) is working in cooperation with the Federal Highway Administration (FHWA), the U.S. Coast Guard, and the National Capital Planning Commission (NCPC) to rehabilitate the Arlington Memorial Bridge.

- The project involves the rehabilitation or replacement of the bridge's bascule span; repairs to deteriorated portions of the abutments, piers and concrete arch approach spans; replacement of steel structural components under the bridge's sidewalks; improvements to the existing drainage system; and other nonstructural bridge improvements.
- Dredging is anticipated to be carried out with a mechanical dredge, and will take place within turbidity curtains. The dredged material will be disposed of at an upland facility.
- The cofferdam's steel sheet piles, approximately 66 inches or less, will be installed with a vibratory hammer.
- All in-water project construction including installation of the cofferdam and dredging is prohibited between February 15 and June 30 of any year, and will occur behind turbidity curtains.
- A total of four to six stationary barges and two barges for dredging and transporting materials are anticipated

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 § 402.02). For this project, the action area includes the project footprint in the Potomac River, vessel transit routes, as well

as all underwater areas where ESA listed species under our jurisdiction may be exposed to the effects of the action (increased noise, increase in turbidity, interaction with vessels, etc.). The barges used for transporting construction materials will be staged at two locations, 805 meters (0.5 miles) and 322 meters (0.2 miles) away from the bridge. Turbidity will be contained by the use of turbidity curtains around the project footprint, and underwater noise may be experienced up to 80 meters away from pile driving activity.

The Arlington Memorial Bridge spans the Potomac River at river kilometer (rkm) 175, between the National Mall in Washington, DC, and the Arlington National Cemetery, Virginia. In the action area, the sediment is soft and loose, and the Potomac River is 0.56 kilometers wide.

NMFS Listed Species in the Action Area

Atlantic Sturgeon
There are five DPSs of Atlantic sturgeon listed as threatened or endangered. Atlantic sturgeon originating from the New York Bight, Chesapeake Bay, South Atlantic, and Carolina DPSs are listed as endangered, while the Gulf of Maine DPS is listed as threatened. The marine range of all five DPSs extends along the Atlantic coast from Canada to Cape Canaveral, Florida (Damon-Randall *et al.* 2013). Based on the best available information, Atlantic sturgeon originating from any of the five DPSs could occur in the area near rkm 175 of the Potomac River.

The distribution of Atlantic sturgeon is also strongly associated with prey availability, and Atlantic sturgeon may occur where suitable forage (*e.g.*, benthic invertebrates such as polychaete worms) and appropriate habitat conditions (*e.g.*, areas of submerged aquatic vegetation) are present. In rivers and estuaries, Atlantic sturgeon typically use the deepest water available; however, Atlantic sturgeon also occur over shallow (2.5 m), tidally influenced mud and sand flats and mud as well as mixed cobble substrates (Savoy and Pacileo 2003). Occurrence in these shallow waters is thought to be tied to the presence of benthic resources for foraging. The distribution of Atlantic sturgeon is strongly associated with prey availability, and Atlantic sturgeon may occur where suitable forage (e.g., benthic invertebrates, mollusks and crustaceans) and appropriate habitat conditions (e.g., sandy bottom, or areas of submerged aquatic vegetation (SAV)) are present. The sediment in the action area is not known to be sandy; however, the Potomac River supports areas of SAV in nearshore, shallow waters, so opportunistic foraging may occur in the action area.

Atlantic sturgeon are well distributed throughout the Chesapeake Bay with spawning known to occur in the James River system and the York River (other Chesapeake Bay tributaries may also support spawning, but documented evidence is currently lacking). However, given the distance from the spawning grounds and that spawning has not been documented in the Potomac River, no adults engaged in spawning, eggs, larvae or juvenile Atlantic sturgeon are known to occur in the action area. The only life stages present would be subadults and non-spawning adults.

Shortnose Sturgeon
Shortnose sturgeon occur in rivers and estuaries along the East Coast of the U.S. and Canada (SSSRT 2010). There are 19 documented populations of shortnose sturgeon ranging from the St. Johns River, Florida (possibly extirpated from this system) to the Minas Basin in Nova Scotia,

Canada (NMFS 1998; Dadswell *et al.* 2013). While movements between river systems have been documented in the Gulf of Maine, between the Connecticut and Hudson, and in the Southeast, interbreeding between river populations is limited to very few individuals per generation; this results in morphological and genetic variation between most river populations (see Walsh *et al.* 2001; Grunwald *et al.* 2002; Waldman *et al.* 2002; Wirgin *et al.* 2005). Indirect gene flow estimates from mitochondrial DNA indicate an effective migration rate of less than two individuals per generation (SSSRT 2010). This means that while individual shortnose sturgeon may move between rivers, very few sturgeon are spawning outside their natal river; it is important to remember that the result of physical movement of individuals is rarely genetic exchange.

The current abundance of shortnose sturgeon in the Chesapeake Bay is unknown. Incidental capture of shortnose sturgeon was reported to the USFWS and MDDNR between 1996-2008 as part of an Atlantic Sturgeon Reward Program. During this time, 80 shortnose sturgeon were documented in the Maryland waters of the Bay and in several tidal tributaries. To date, no shortnose sturgeon have been recorded in Virginia waters of the Bay. The Chesapeake-Delaware canal is used by sturgeon to move between the Bay and the Delaware River (SSSRT 2010).

Suitable spawning habitat exists within the tributaries of the Chesapeake Bay. Research on other shortnose sturgeon populations indicates that this species typically spawns just below the limit of upstream passage, often the fall line (Kynard 1997). Several Chesapeake Bay tributaries, such as the Potomac River, have habitat characteristics such as cobble/gravel substrate and areas of high flow that may be suitable for spawning. While an extensive study of shortnose sturgeon in the Potomac River has not been conducted, the data resulting from the tracking of the two females by Kynard et al. (2007) provides valuable information on habitat use and the likely distribution of the species within the River. The most upstream reach of the River used (rkm 185–187) contained potential spawning habitat. Spawning has not been documented in any tributary of the Chesapeake Bay although suitable spawning habitat and two pre-spawning females with late stage eggs have been documented in the Potomac River. Current information indicates that shortnose sturgeon are present year round in the Potomac River with foraging and overwintering taking place here.

Shortnose sturgeon feed on benthic insects, crustaceans, mollusks, and polychaetes (Dadswell et al. 1984). Both juvenile and adult shortnose sturgeon primarily forage over sandy-mud bottoms, which support benthic invertebrates (Carlson and Simpson 1987, Kynard 1997). Shortnose sturgeon have also been observed feeding off plant surfaces (Dadswell et al. 1984).

Effects of the Action

Capture in the Dredge

Mechanical dredging entails lowering the open bucket or clamshell through the water column, closing the bucket after impact on the bottom, lifting the bucket up through the water column, and emptying the bucket into a barge. The bucket operates without suction or hydraulic intake, moves relatively slowly through the water column and impacts only a small area of the bottom at any time. In order to be captured in a dredge bucket, an animal must be on the bottom in the immediate area where the dredge bucket is opened. Aquatic species can be captured in dredge buckets and can be injured or killed if entrapped in the bucket or buried in sediment during

dredging and/or when sediment is deposited into the dredge scow. Fish captured and emptied out of the bucket can suffer stress or injury, which can lead to mortality.

Based on all available evidence, the risk of capture in a mechanical dredge is low since the dredging area is near the shoreline, will only occur outside the February 15 through July 1 time of year restriction, and the dredging area will be enclosed with a turbidity curtain, so sturgeon are unlikely to be exposed to the dredge. Because of these factors, it is extremely unlikely that any sturgeon will be captured, injured or killed during mechanical dredging activities. Therefore, all effects to sturgeon from the proposed dredging activities will be discountable.

Dredging Effects on Foraging and Migration
Dredging can affect sturgeon by reducing prey species through the alteration of the existing biotic assemblages and habitat. Dredging will only remove shoreline sediment necessary to allow for barge access to the bridge, and any benthic resources present would be expected to recolonize after shoreline disruptions were finished. Thus, the removal of any benthic resources will be temporary and will not affect a detectable change to sturgeon foraging behavior and therefore, effects are insignificant.

The February 15 – July 1 time of year restriction on dredging, cofferdam installation and pier rehabilitation will be utilized to minimize the chance of sturgeon presence in the action area. Additionally, the proposed actions will not alter the habitat in any way that prevents Atlantic or shortnose sturgeon from using the action area as a transit route to other areas of the Potomac River or Chesapeake Bay that may be more suitable for foraging; therefore, any disruption of essential life behaviors such as migrating or foraging is extremely unlikely to occur, and effects are discountable.

Water Quality Effects of Dredging
Dredging will disturb sediments and may cause a temporary increase in suspended sediment. Any sediment plume is expected to be small and to settle out of the water column within a few hours. The use of a turbidity curtain will minimize water quality impacts by blocking the release of suspended sediment into Potomac River. Therefore, we do not anticipate any sturgeon outside of the silt curtain to be exposed to any increased turbidity or suspended sediment resulting from dredging within the silt curtain.

Pile Driving
Pile driving produces underwater sound pressure waves that can affect aquatic species, including sturgeon. Effects to fish can range from temporary avoidance of an area to death due to injury of internal organs, such as swim bladders. The type and size of pile, installation method (i.e., vibratory vs. impact hammer), size of the organism (smaller individuals are more susceptible to effects) and particular species, and distance from the sound source (i.e., sound dissipates over distance so noise levels are greater closer to the source) all contribute to the likelihood of effects to an individual. Generally, the larger the pile and the closer an individual is to the pile, the greater the likelihood of effects.

Background Information on Noise and Sturgeon

Sturgeon rely primarily on particle motion to detect sounds (Lovell *et al.* 2005). While there are no data either in terms of hearing sensitivity or structure of the auditory system for Atlantic and shortnose sturgeon, there are data for the closely related lake sturgeon (Lovell *et al.* 2005, Meyer *et al.* 2010), which because of the biological similarities, for the purpose of considering acoustic impacts, are a good surrogate for Atlantic and shortnose sturgeon. The available data suggest that lake sturgeon can hear sounds from below 100 Hz to 800 Hz (Lovell *et al.* 2005, Meyer *et al.* 2010). However, since these two studies examined responses of the ear and did not examine whether fish would behaviorally respond to sounds, it is hard to determine thresholds for hearing (that is, the lowest sound levels that an animal can hear at a particular frequency) using information from these studies. The best available information indicates that Atlantic and shortnose sturgeon are not capable of hearing noise in frequencies above 1000 Hz (1 kHz) (Popper 2005). Sturgeon are categorized as hearing "generalists" or "non-specialists" (Popper 2005). Sturgeon do not have any specializations, such as a coupling between the swim bladder and inner ear, to enhance their hearing capabilities, which makes these fish less sensitive to sound than hearing specialists. Low-frequency impulsive energies, including pile driving, cause swim bladders to vibrate, which can cause damage to tissues and organs as well as to the swim bladder (Halvorsen *et al.* 2012a). Sturgeon have a physostomous (open) swim bladder, meaning there is a connection between the swim bladder and the gut (Halvorsen *et al.* 2012a). Fish with physostomous swim bladders, including Atlantic and shortnose sturgeon, are able to expel air, which can diminish tension on the swim bladder and reduce damaging effects during exposure to impulsive sounds. Fish with physostomous swim bladders are expected to be less susceptible to injury from exposure to impulsive sounds, such as pile driving, than fish with physoclistous (no connection to the gut) swim bladders (Halvorsen *et al.* 2012a).

If a noise is within a fish's hearing range and is loud enough to be detected, effects can range from mortality to a minor change in behavior (e.g., startle), with the severity of effects increasing with the loudness and duration of the noise (Hastings and Popper 2005). The actual nature of effects and the distance from the source at which they could be experienced will vary and depend on a large number of factors, such as fish hearing sensitivity, source level, how the sounds propagate away from the source and the resultant sound level at the fish, whether the fish stays in the vicinity of the source, the motivation level of the fish, etc.

Criteria for Assessing the Potential for Physiological Effects to Sturgeon

The Fisheries Hydroacoustic Working Group (FHWG) was formed in 2004 and consists of biologists from NMFS, USFWS, FHWA, and the California, Washington, and Oregon DOTs, supported by national experts on sound propagation activities that affect fish and wildlife species of concern. In June 2008, the agencies signed a Memorandum of Agreement documenting criteria for assessing physiological effects of pile driving on fish. The criteria were developed for the acoustic levels at which physiological effects to fish could be expected. It should be noted that these are onset of physiological effects (Stadler and Woodbury 2009), and not levels at which fish are necessarily mortally damaged. These criteria were developed to apply to all species, including listed green sturgeon, which are biologically similar to Atlantic and shortnose sturgeon and, for these purposes, is considered a surrogate. The interim criteria are:

- Peak Sound Pressure Level (SPL): 206 decibels relative to 1 micro-Pascal (dB re 1 μPa) (206 dB_{Peak}).
- Cumulative Sound Exposure Level (cSEL): 187 decibels relative to 1 micro-Pascal-squared second (dB re 1μPa^2-s) for fishes above 2 grams (0.07 ounces) (187 dBcSEL).
- cSEL: 183 dB re 1μPa^2-s for fishes below 2 grams (0.07 ounces) (183 dBcSEL).

At this time, these criteria represent the best available information on the thresholds at which physiological effects to sturgeon from exposure to impulsive noise, such as pile driving, are likely to occur. Therefore, we will consider the potential for physiological effects upon exposure to impulsive noise of 206 dB_{Peak} and 187 dBcSEL. Use of the 183 dBcSEL threshold is not appropriate for this consultation because all sturgeon in the action area will be larger than 2 grams. It is important to note that physiological effects may range from minor injuries from which individuals are anticipated to completely recover with no impact to fitness to significant injuries that will lead to death. The severity of injury is related to the distance from the pile being installed and the duration of exposure. The closer the fish is to the source and the greater the duration of the exposure, the higher likelihood of significant injury.

Available Information for Assessing Behavioral Effects on Sturgeon
To date, neither we nor the FHWG have published criteria for underwater noise levels resulting in behavioral responses. However, in practice, we rely on a level of 150 dB re 1uPa RMS as a conservative indicator as to when a behavioral response can be expected in fish exposed to impulsive noise such as pile driving. This level is based on the available literature where fish behavior has been observed (see Fewtrell 2003 and Mueller-Blenkle *et al.* 2010). Because there are no published studies establishing the noise levels at which sturgeon respond behaviorally to noise, these studies of fish—which are likely more sensitive to noise than Atlantic or shortnose sturgeon—are a reasonable conservative indicator of when sturgeon can be expected to respond behaviorally to noise.

We are aware of only one study that has attempted to assess the behavioral responses of sturgeon to underwater noise. A monitoring plan is currently being implemented at the Tappan Zee Bridge replacement project (Hudson River, New York) using acoustic telemetry receivers to examine the behavior of acoustically tagged sturgeon. During the installation of test piles, the movements of tagged Atlantic sturgeon were monitored with a series of acoustic receivers. Tagged Atlantic sturgeon spent significantly less time in the detection area (an area that encompassed the 206 dB re 1uPa peak, 187 dB re 1uPa 2s cSEL and 150 dB re 1uPa RMS SPL isopleths), during active impact pile driving compared to that time period just prior to the work window. Results of this study indicate that sturgeon are likely to avoid areas with potentially injurious levels of noise (AKRF and Popper (2012a, 2012b)). However, due to limitations of the study design, it is not possible to establish the threshold noise level that results in behavioral modification or avoidance of Atlantic sturgeon. Monitoring is ongoing as the bridge project progresses. To date, hundreds of tagged sturgeon have been documented in the project area; however, no sturgeon have been injured or killed as a result of exposure to pile-driving noise.

For the purposes of this analysis, we will use 150 dB re 1 μPa RMS as a conservative indicator of the noise level at which there is the potential for behavioral effects, provided the operational frequency of the source falls within the hearing range of the species of concern. That is not to say

that exposure to noise levels of 150 dB re 1 µPa RMS will always result in behavioral modifications or that any behavioral modifications will rise to the level of "take" (i.e., harm or harassment) but that there is a potential, upon exposure to noise at this level, to experience some behavioral response. We expect that behavioral responses could range from a temporary startle to avoidance of the area with disturbing levels of sound. The effect of any anticipated response on individuals will be considered in the effects analysis below.

Table 1 below describes the estimated average underwater noise levels produced by the driving of similar sized piles associated with this action (data from ICF Jones and Stokes and Illingworth and Rodkin, Inc. 2009). The noise levels for dB_{Peak} and dB_{RMS} are taken from a distance of 10 meters from the pile being driven; dB_{sSEL} is measured at 60 meters.

Table 1: Estimated average underwater noise level produced by the driving of piles[1, 2]

Type of Pile	Hammer Type	Estimated Peak Noise Level (dB_{Peak})	Estimated Pressure Level (dB_{RMS})	Estimated sound exposure level (dB_{sSEL})
CIDH Steel Pile (66" diameter)	Vibratory Hammer	210	195	158

Actual sound levels are dependent not only on the pile and hammer characteristics, but also on the geometry and boundaries of the surrounding underwater and benthic environment. However, the values presented above represent a reasonable estimate of the sound that will be produced during the construction. This is because the piles are the same size and material and were installed in similar water depths. As the distance from the source increases, underwater sound levels produced by pile driving are known to dissipate rapidly.

Underwater noise levels produced from the driving of concrete piles will attenuate approximately 5 dB every 10 meters (ICF Jones and Stokes and Illingworth and Rodkin, Inc. 2009). This value is are based on a conservative estimate of attenuation rates for the driving of timber piles (ICF Jones and Stokes and Illingworth and Rodkin, Inc.) as attenuation rates for concrete piles are not available.

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[1] **Peak sound pressure level**: the largest absolute value of the instantaneous sound pressure and is expressed as dB re: 1 µPa.

Root Mean Square (RMS) pressure: the square root of the average squared pressures over the duration of a pulse; most pile-driving impulses occur over a 50 to 100 millisecond (msec) period, with most of the energy contained in the first 30 to 50 msec (Illingworth and Rodkin, Inc. 2001, 2009). Therefore, RMS pressure levels are generally "produced" within seconds of pile driving operations, and represent the effective pressure, and its resultant intensity (in dB re: 1 µPa;), produced by a sound source.

Sound Exposure Level (SEL): that level which, lasting for one second, has the same acoustic energy as the transient and is expressed as dB re: 1µPa2•sec.

[2] Steel sheet pile values taken from I.10.3 of Appendix 1, ICF Jones and Stokes and Illingworth and Rodkin, Inc. 2009; water depth was 4 meters.

Peak noise levels will be above 206 dB re 1 μPaPeak within 10 meters of the pile driving. Therefore, there is potential for a sturgeon to experience physiological impacts, including injury, upon exposure to a single pile strike. We expect sturgeon would swim away from the sound source and never be exposed to potentially injurious levels of underwater noise. If the sturgeon happen to be within 10 meters at the time pile driving commences, we still expect the sturgeon to leave the area before injurious levels of noise are reached. This is because pile driving hammers have a ramp up period, so the first several blows produce less noise. Furthermore, we expect sturgeon to modify their behavior and leave the area in a matter of seconds, well before the cSEL threshold (a cumulative effect of multiple exposures) is reached. Therefore, no injury is anticipated.

In addition to the "peak" exposure criteria which relates to the energy received from a single pile strike, the potential for injury exists for multiple exposures to noise over a period of time; this is accounted for by the cSEL threshold. The cSEL is not an instantaneous maximum noise level, but is a measure of the accumulated energy over a specific period of time (e.g., the period of time it takes to install a pile). When it is not possible to accurately calculate the distance to the 187 dB re 1uPa cSEL re: 1μPa^2•s isopleth, we calculate the distance to the 150 dB re 1uPa sSEL isopleth.[3] The further a fish is away from the pile being driven, the more strikes it must be exposed to accumulate enough energy to result in injury. At some distance from the pile, a fish is far enough away that, regardless of the number of strikes it is exposed to, the energy accumulated is low enough that there is no potential for injury. This distance is where the 150 dB re 1uPa sSEL isopleth occurs (Stadler and Woodbury 2009). A fish located outside of this isopleth has no potential for injury, regardless of the number of pile strikes it is exposed to (i.e., sound levels will not accumulate to injurious levels). The distance to the 150 dB re 1uPa sSEL isopleth is 100 meters. In order to be exposed to potentially injurious levels of noise during installation of the piles, a sturgeon would need to be within 100 meters of the pile being driven for. This is extremely unlikely to occur because we expect sturgeon to modify their behavior (i.e., avoid an ensonified area) upon exposure to underwater noise levels of 150 dB re 1 μPa_{RMS}. Given that a sturgeon would be exposed to levels of noise that cause behavioral modification (at 80 m, see Table 2 below) before being exposed to injurious levels of noise (within 80 m of the pile), we expect sturgeon would swim away from the sound source and never be exposed to potentially injurious levels of underwater noise. Therefore, no injury or other physiological effects are anticipated.

[3] The Practical Spreading Loss Model is used to determine underwater noise attenuation rates and can be used to calculate the distance at which a specific noise value (e.g., cSEL) is attained. This model is not a reliable predictor of attenuation in shallow, relatively confined waters such as rivers and typically results in overestimates of distances to thresholds of concern. For that reason, we are not using that model to estimate the distance to the 187 dB re 1uPa^2s criteria. Rather, we estimate the distance to the 150 dB re 1uPa sSEL isopleth, using reported attenuation rates not the practical spreading loss model. Regardless of the number of pile strikes a fish is exposed to, we recognize there is no potential for injury to a fish t exposed to noise below 150 dB re 1uPa sSEL (see Stadler and Woodbury 2009). Calculating the distance to the 150 dB re 1uPa sSEL isopleth allows us to calculate the distance from the pile at which there is no potential for physiological effects, including injury. We assume for these analyses, that a fish that remains between the pile and the 150 dB re 1uPa sSEL isopleth could be injured although we cannot accurately predict how close a fish would need to be or for how long it would need to stay there.

Behavioral Effects of Pile Driving to Sturgeon
Behavioral effects, such as avoidance or disruption of foraging activities, may occur in sturgeon exposed to noise above 150 dB re 1 μPa_{RMS}. Underwater noise levels produced from the driving of concrete piles will attenuate approximately 5 dB every 10 meters. These values are based on a conservative estimate of attenuation rates for the driving of timber piles (ICF Jones and Stokes and Illingworth and Rodkin, Inc.). Estimated sound exposure level (dB_{sSEL}) was not measured at 10 meters from the pile driving, but at 60 meters it was measured as 158 dB_{sSEL}. Therefore, at 80 meters, the estimated sound exposure level will below 150 dB_{sSEL}.

Table 2: Calculated distances at which noise levels are expected to be below 150 db re 1uPa RMS

Type Pile	Hammer Type	Distance from pile at which noise levels will be below 150 dB_{RMS}
Steel sheet pile	Vibratory Hammer	80 meters

Should an Atlantic sturgeon occur within the area where piles are being driven, it is reasonable to assume that it, on hearing the pile driving sound, would either avoid the source or move around it. Since the area that would be avoided extends only 80 m around a piling, and the width of the Potomac River in the action area is approximately 560 meters wide, nearly 85.7% of the river would be available for unimpeded movements. If any movements away from the area where piles are being installed do occur, it is extremely unlikely that these movements will affect any sturgeon due to the very small around to be avoided. Additionally, the extent of underwater noise is not likely to present a barrier to sturgeon movements and as such, if individuals are present within the vicinity of the action area, they are likely to veer/swim away from the pile driving sites and continue normal behaviors (e.g., feeding, resting, and migrating) in other portions of the action area and/or in other locations in the Potomac River. Based on this analysis, effects to Atlantic sturgeon from pile driving noise will not be able to be meaningfully measured or detected and are insignificant.

Water Quality Effects from Pile Driving
The installation and removal of the steel sheet piles will disturb bottom sediments and may cause a temporary increase in suspended sediment in the action area. However, cofferdam installation will occur behind a turbidity curtain, so increased turbidity in the river will not be experienced, and sturgeon will not be exposed to the increased turbidity.

Disposal of Dredged Materials
The dredged material will be disposed of at an upland location. Since the material will not be disposed of overboard in the Potomac River or Chesapeake Bay, no impacts to the water quality will occur. Therefore, sturgeon will not be exposed to effects of dredged material disposal.

Vessel Interactions
The dredging and disposal operations will result in increased vessel traffic in the area, consisting of four to six stationary barges and two barges for dredging and transporting materials. Any increases in vessel traffic due to the proposed project will be temporary and are not expected to be significant relative to the existing vessel traffic in these areas. While the exact number of

sturgeon killed as a result of being struck by boat hulls or propellers is unknown, it is a concern in some areas. The factors relevant to determining the risk to these species from vessel strikes may be related to navigational clearance (i.e., depth of water and draft of the vessel) in the area where the vessel is operating (i.e., narrow river stretches), and the behavior of individuals in the area (e.g., foraging, migrating, etc.).

In general, research into the potential for vessel interactions indicates that most mortality occurs from propellers of deep draft ocean going cargo ships (Balazik *et al.* 2012).We do not believe that vessel traffic associated with the action would increase the risk of interactions between any Atlantic or shortnose sturgeon and vessels because the vessels used in this project are shallow draft barges. Based on this information, interactions between sturgeon and the barges are extremely unlikely to occur. Therefore, the effects of an increase in vessel traffic will be discountable.

We have considered the likelihood that an increase in vessel traffic associated with the project increased the risk of interactions between Atlantic and shortnose sturgeon and vessels in the project area, compared to baseline conditions. The use of barges will cause a small, localized, temporary increase in vessel traffic. Given the large volume of traffic in the project area, the increase in traffic associated with the project is extremely small. Based on this information, we believe the effects of vessel traffic on Atlantic or shortnose sturgeon from are insignificant.

Conclusions

Based on the analysis that any effects to listed species will be insignificant or discountable, we concur with your determination that the dredging is not likely to adversely affect any listed species or critical habitat under our jurisdiction. Therefore, no further consultation pursuant to section 7 of the ESA is required.

Reinitiation of consultation is required and shall be requested by the Federal agency or by the Service, where discretionary Federal involvement or control over the action has been retained or is authorized by law and: (a) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered in the consultation; (b) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the consultation; or (c) If a new species is listed or critical habitat designated that may be affected by the identified action. No take is anticipated or exempted. If there is any incidental take of a listed species, reinitiation would be required. Should you have any questions about this correspondence, please contact Ms. Ainsley Smith at (978) 281-9291 or by email (Ainsley.Smith@Noaa.gov).

Essential Fish Habitat
NMFS' Habitat Conservation Division (HCD) is responsible for overseeing issues related to Essential Fish Habitat (EFH) designated under the Magnuson-Stevens Fishery Conservation and Management Act and other NOAA trust resources under the Fish and Wildlife Coordination Act. If you have any questions regarding EFH, please contact Kristy Beard (410-573-4542; Kristy.Beard@noaa.gov). Please send a copy of the draft EA to Kristy Beard when it goes out for public notice.

Sincerely,

Kimberly B. Damon-Randall
Assistant Regional Administrator
for Protected Resources

EC: NMFS, Smith, Beard
NPS, Culver

File Code: Non-Fisheries\NPS\Informals\2015\NPS Arlington Memorial Bridge Rehabilitation

PCTS: NER-2015-12633

References:

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United States Department of the Interior

NATIONAL PARK SERVICE
George Washington Memorial Parkway
c/o Turkey Run Park
McLean, Virginia 22101

November 26, 2012

Mr. David Maloney
D.C. State Historic Preservation Officer
Office of Planning
1100 4th Street, SW, Suite E650
Washington, DC 20024
Attn: Mr. C. Andrew Lewis

Subject: **Initiation of Section 106 Consultation for the Rehabilitation of the Arlington Memorial Bridge, Washington, DC.**

Dear Mr. Lewis:

The National Park Service (NPS) is proposing to rehabilitate the Arlington Memorial Bridge within the George Washington Memorial Parkway (GWMP), Washington, DC (see attached map). The Arlington Memorial Bridge is listed in the National Register of Historic Places (NRHP) as part of the Bridge and Memorial Avenue complex, which symbolically re-unites the North and South by connecting the Lincoln Memorial in Washington, DC with Arlington House, the Robert E. Lee Memorial in Virginia. The Bridge is part of monumental Washington and is a noted architectural and engineering accomplishment; the overall design was by McKim, Mead, and White and the unique bascule span was created by Strauss Engineering Corporation. The Arlington Memorial Bridge and Memorial Avenue complex is an important element within the cultural landscape of the GWMP, which is also listed in the NRHP.

In accordance with the requirements of Section 106 of the National Historic Preservation Act (16 U.S.C. §470) of 1966 and implementing regulations (36 CFR Part 800), the NPS will consider the effects of this undertaking to historic properties. The purpose of this letter is to officially initiate Section 106 consultation between the NPS and the District of Columbia State Historic Preservation Office (SHPO). Initiation letters have also been sent to the Advisory Council on Historic Preservation (ACHP) and the Virginia Department of Historical Resources.

Concurrent to Section 106 consultation, the NPS will also begin to prepare an Environmental Assessment (EA) in accordance with the National Environmental Policy Act of 1969 (NEPA) to evaluate the potential environmental impacts that would result from the proposed action. The EA will evaluate a range of alternatives to rehabilitate the bridge to correct deterioration that has occurred over time.

In the coming months, the NPS will undertake appropriate studies and consultations in accordance with Section 106 and NEPA. At this time, the NPS invites you to provide initial comments regarding the proposed action.

I would appreciate receiving any preliminary comments you may have by January 17, 2013. Comments can be mailed to:

Jon G. James, Acting Superintendent
George Washington Memorial Parkway
c/o Turkey Run Park
McLean, Virginia 22101

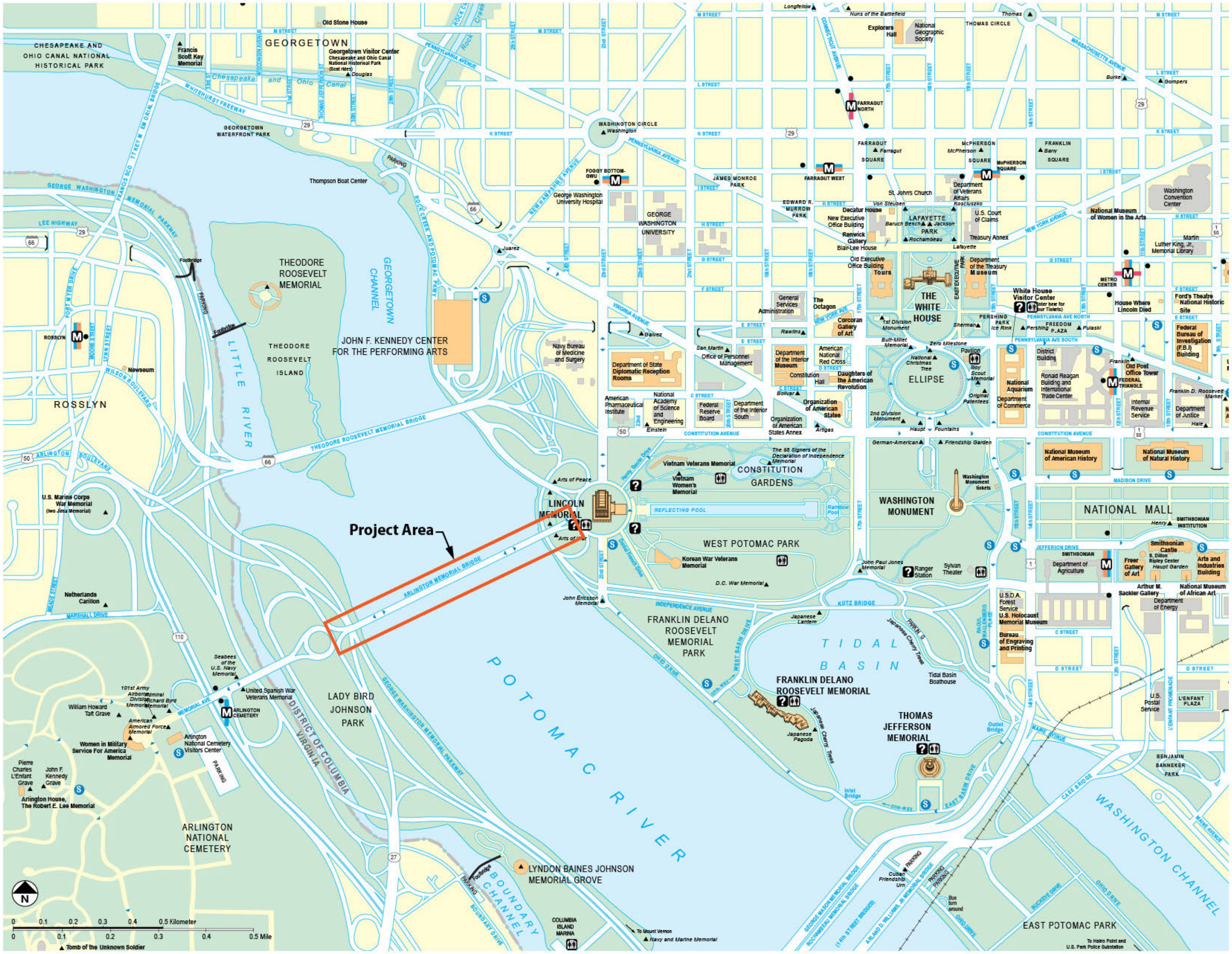
If you have any questions regarding this project, please feel free to contact Cultural Resource Manager, Matt Virta at 703-289-2535 or matthew_virta@nps.gov.

Sincerely,

Jon G. James, Acting Superintendent
George Washington Memorial Parkway

Enclosures: Project site map

cc: Joel Gorder, NPS National Capital Region
Matt Virta, George Washington Memorial Parkway
Karen Arey, NPS Denver Service Center
Steve Culver, NPS Denver Service Center
Perry Wheelock, NPS National Capital Region
Joan Glynn, Greenhorne & O'Mara, Inc.



Location Map: Arlington Memorial Bridge

United States Department of the Interior

NATIONAL PARK SERVICE
George Washington Memorial Parkway
c/o Turkey Run Park
McLean, Virginia 22101

November 26, 2012

Mr. Reid Nelson, Director
Advisory Council on Historic Preservation
Federal Agency Programs
Old Post Office Building
1100 Pennsylvania Avenue, NW, Suite 803
Washington, DC 20004

Subject: **Initiation of Section 106 Consultation for the Rehabilitation of the Arlington Memorial Bridge, Washington, DC.**

Dear Mr. Nelson:

The National Park Service (NPS) is proposing to rehabilitate the Arlington Memorial Bridge within the George Washington Memorial Parkway (GWMP), Washington, DC (see attached map). The Arlington Memorial Bridge is listed in the National Register of Historic Places (NRHP) as part of the Bridge and Memorial Avenue complex, which symbolically re-unites the North and South by connecting the Lincoln Memorial in Washington, DC with Arlington House, the Robert E. Lee Memorial in Virginia. The Bridge is part of monumental Washington and is a noted architectural and engineering accomplishment; the overall design was by McKim, Mead, and White and the unique bascule span was created by Strauss Engineering Corporation. The Arlington Memorial Bridge and Memorial Avenue complex is an important element within the cultural landscape of the GWMP, which is also listed in the NRHP.

In accordance with the requirements of Section 106 of the National Historic Preservation Act (16 U.S.C. §470) of 1966 and implementing regulations (36 CFR Part 800), the NPS will consider the effects of this undertaking to historic properties. The purpose of this letter is to officially initiate Section 106 consultation between the NPS and the Advisory Council on Historic Preservation (ACHP). The NPS requests your participation in the Section 106 process for this project due to the nature of the resource and the complexity of the undertaking as outlined in 36 CFR Part 800 Appendix A. Initiation letters have also been sent to the District of Columbia State Historic Preservation Office (SHPO) and the Virginia Department of Historical Resources.

Concurrent to Section 106 consultation, the NPS will also begin to prepare an Environmental Assessment (EA) in accordance with the National Environmental Policy Act of 1969 (NEPA) to evaluate the potential environmental impacts that would result from the proposed action. The EA will evaluate a range of alternatives to rehabilitate the bridge to correct deterioration that has occurred over time.

In the coming months, the NPS will undertake appropriate studies and consultations in accordance with Section 106 and NEPA. At this time, the NPS invites you to provide initial comments regarding the proposed action.

I would appreciate receiving any preliminary comments you may have by January 17, 2013. Comments can be mailed to:

Jon G. James, Acting Superintendent
George Washington Memorial Parkway
c/o Turkey Run Park
McLean, Virginia 22101

If you have any questions regarding this project, please feel free to contact Cultural Resource Manager, Matt Virta at 703-289-2535 or matthew_virta@nps.gov.

Sincerely,

Jon G. James, Acting Superintendent
George Washington Memorial Parkway

Enclosures: Project site map

cc: Joel Gorder, NPS National Capital Region
Matt Virta, George Washington Memorial Parkway
Karen Arey, NPS Denver Service Center
Steve Culver, NPS Denver Service Center
Perry Wheelock, NPS National Capital Region
Joan Glynn, Greenhorne & O'Mara, Inc.

Location Map: Washington Bridge

United States Department of the Interior

NATIONAL PARK SERVICE
George Washington Memorial Parkway
c/o Turkey Run Park
McLean, Virginia 22101

November 26, 2012

Ms. Kathleen Kilpatrick
Department of Historic Resources
Office of Review and Compliance
2801 Kensington Avenue
Richmond, VA 23221
Attn: Ms. Ethel Eaton

Subject: **Initiation of Section 106 Consultation for the Rehabilitation of the Arlington Memorial Bridge, Washington, DC.**

Dear Ms. Eaton:

The National Park Service (NPS) is proposing to rehabilitate the Arlington Memorial Bridge within the George Washington Memorial Parkway (GWMP), Washington, DC (see attached map). The Arlington Memorial Bridge is listed in the National Register of Historic Places (NRHP) as part of the Bridge and Memorial Avenue complex, which symbolically re-unites the North and South by connecting the Lincoln Memorial in Washington, DC with Arlington House, the Robert E. Lee Memorial in Virginia. The Bridge is part of monumental Washington and is a noted architectural and engineering accomplishment; the overall design was by McKim, Mead, and White and the unique bascule span was created by Strauss Engineering Corporation. The Arlington Memorial Bridge and Memorial Avenue complex is an important element within the cultural landscape of the GWMP, which is also listed in the NRHP.

In accordance with the requirements of Section 106 of the National Historic Preservation Act (16 U.S.C. §470) of 1966 and implementing regulations (36 CFR Part 800), the NPS will consider the effects of this undertaking to historic properties. The purpose of this letter is to officially initiate Section 106 consultation between the NPS and the Virginia Department of Historical Resources. Initiation letters have also been sent to the Advisory Council on Historic Preservation (ACHP) and the District of Columbia State Historic Preservation Office (SHPO).

Concurrent to Section 106 consultation, the NPS will also begin to prepare an Environmental Assessment (EA) in accordance with the National Environmental Policy Act of 1969 (NEPA) to evaluate the potential environmental impacts that would result from the proposed action. The EA will evaluate a range of alternatives to rehabilitate the bridge to correct deterioration that has occurred over time.

In the coming months, the NPS will undertake appropriate studies and consultations in accordance with Section 106 and NEPA. At this time, the NPS invites you to provide initial comments regarding the proposed action.

I would appreciate receiving any preliminary comments you may have by January 17, 2013. Comments can be mailed to:

Jon G. James, Acting Superintendent
George Washington Memorial Parkway
c/o Turkey Run Park
McLean, Virginia 22101

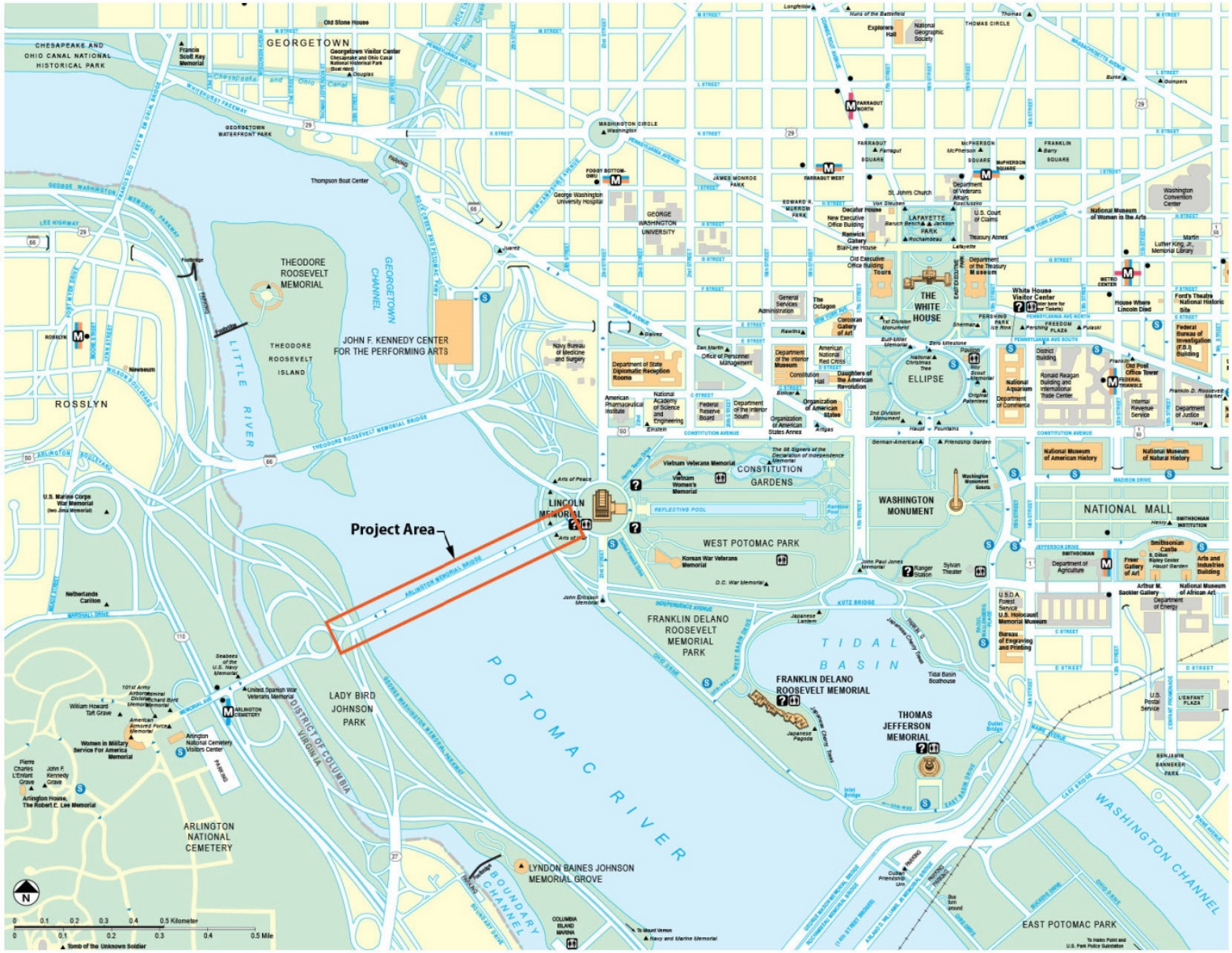
If you have any questions regarding this project, please feel free to contact Cultural Resource Manager, Matt Virta at 703-289-2535 or matthew_virta@nps.gov.

Sincerely,

Jon G. James, Acting Superintendent
George Washington Memorial Parkway

Enclosures: Project site map

cc: Joel Gorder, NPS National Capital Region
Matt Virta, George Washington Memorial Parkway
Karen Arey, NPS Denver Service Center
Steve Culver, NPS Denver Service Center
Perry Wheelock, NPS National Capital Region
Joan Glynn, Greenhorne & O'Mara, Inc.



Location Map: Arlington Memorial Bridge

COMMONWEALTH of VIRGINIA

Department of Historic Resources

Douglas W. Domenech
Secretary of Natural Resources

2801 Kensington Avenue, Richmond, Virginia 23221

Kathleen S. Kilpatrick
Director

Tel: (804) 367-2323
Fax: (804) 367-2391
TDD: (804) 367-2386
www.dhr.virginia.gov

December 17, 2012

Jon G. James, Acting Superintendent
National Park Service
George Washington Memorial Parkway
Turkey Run Park
McLean, Virginia 22101

Re: Proposed Rehabilitation of the Arlington Memorial Bridge
George Washington Memorial Parkway
Washington, D. C. and Arlington County, Virginia
DHR File No. 2012-1831
Received December 14, 2012

Dear Mr. James:

Thank you for your letter of December 6, 2012 advising us that the National Park Service is initiating the Section 106 process for the proposed rehabilitation of the Arlington Memorial Bridge (DHR ID# 00014). The Arlington Memorial Bridge is listed on the National Register of Historic Places as part of the Bridge and Memorial Avenue Complex, an important element within the cultural landscape of the George Washington Memorial Parkway (DHR ID# 029-0228), which is also listed in the National Register.

We look forward to working with you, the District of Columbia and the other consulting parties as you develop alternatives to rehabilitate the bridge to correct deterioration that has occurred over time. The Department of Historic Resources stands ready to advise and assist the National Park Service in meeting its responsibilities under Section 106 of the National Historic Preservation Act of 1966, as amended.

If you have any questions concerning our comments, or if we may provide any further assistance, please do not hesitate to contact me at (804)482-6088; fax (804) 367-2391; e-mail ethel.eaton@dhr.virginia.gov.

Sincerely,

Ethel R Eaton

Ethel R. Eaton, Ph.D., Senior Policy Analyst
Division of Resource Services and Review

c. Matthew Virta, Cultural Resource Manager

Administrative Services
10 Courthouse Ave.
Petersburg, VA 23803
Tel: (804) 862-6416
Fax: (804) 862-6196

Capital Region Office
2801 Kensington Office
Richmond, VA 23221
Tel: (804) 367-2323
Fax: (804) 367-2391

Tidewater Region Office
14415 Old Courthouse Way 2nd Floor
Newport News, VA 23608
Tel: (757) 886-2807
Fax: (757) 886-2808

Western Region Office
962 Kime Lane
Salem, VA 24153
Tel: (540) 387-5428
Fax: (540) 387-5446

Northern Region Office
5357 Main Street
PO Box 519
Stephens City, VA 22655
Tel: (540) 868-7031
Fax: (540) 868-7033

The Delaware Nation
Cultural Preservation Office
P.O. Box 825 - 31064 State Highway 281- Anadarko, OK 73005
Phone: 405/247-2448 – Fax: 405/247-8905

NAGPRA ext. 1403
Section 106 ext. 1181
Museum ext. 1181
Library ext. 1196
Clerk ext. 1182

September 17, 2014

RE: Initiation of Section 106 Consultation for the Rehabilitation of the Arlington Memorial Bridge, Washington, DC.

Dear Mr. Virta,

The Delaware Nation Cultural Preservation Department received correspondence regarding the above referenced project. Our office is committed to protecting sites important to tribal heritage, culture and religion. Furthermore, the tribe is particularly concerned with archaeological sites that may contain human burials or remains, and associated funerary objects.

As described in your correspondence and upon research of our database(s) and files, we find that the Lenape people occupied this area either prehistorically or historically. However, the location of the project does not endanger cultural or religious sites of interest to the Delaware Nation. Please continue with the project as planned. However, should this project inadvertently uncover an archaeological site or object(s), we request that you halt all construction and ground disturbance activities and immediately contact the appropriate state agencies, as well as our office (within 24 hours).

Please Note the Delaware Nation, the Delaware Tribe of Indians, and the Stockbridge Munsee Band of Mohican Indians are the only Federally Recognized Delaware/Lenape entities in the United States and consultation must be made only with designated staff of these three tribes. We appreciate your cooperation in contacting the Delaware Nation Cultural Preservation Office to conduct proper Section 106 consultation. Should you have any questions regarding this email or future consultation feel free to contact our offices at 405-247-2448 or by email nalligood@delawarenation.com.

Sincerely,

Nekole Alligood
Director

United States Department of the Interior

NATIONAL PARK SERVICE
George Washington Memorial Parkway
c/o Turkey Run Park
McLean, Virginia 22101

IN REPLY REFER TO:
1.A.1. (GWMP-AMB)

June 12, 2014

Commander, United States Coast Guard
5th Coast Guard District
Federal Building
431 Crawford Street
Portsmouth, VA 23704

Dear Commander:

The National Park Service (NPS), in cooperation with the Federal Highway Administration (FHWA), is preparing an Environmental Assessment (EA) pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and our agency's policies and procedures, for the proposed rehabilitation/reconstruction of the Arlington Memorial Bridge, located in Washington, DC. The Arlington Memorial Bridge spans the Potomac River, a navigable waterway of the United States, and modifications may require a bridge permit from the U.S. Coast Guard. The center span of the existing bridge is a bascule span; however, it should be noted that the bridge has been fixed in place and has not opened since the 1960s.

The proposed rehabilitation/reconstruction of the Arlington Memorial Bridge includes the rehabilitation or replacement of the bascule span; repairs to the deteriorated portions of the abutments, piers, and concrete arch approach spans; replacement of the concrete bridge deck; resurfacing the travel lanes; replacement of steel structural components under the sidewalks; replacement of the concrete sidewalks and refitting of granite curbs; repairs to granite bridge railings as needed; repairs to lamp posts as needed; repairs to access panels; installation of a proper drainage system; and other minor nonstructural bridge improvements. As proposed, the project would require the installation of cofferdams around several piers to repair undermining and substantial cracking, the use of containment systems to catch falling debris, lead abatement, and the use of barges that may require dredging and the temporary relocation of navigation channels during construction.

With this letter, we extend the U.S. Coast Guard an invitation to become a cooperating agency with the NPS and FHWA in the development of the NEPA document for the subject project in accordance with 40 CFR 1501.6 of the Council on Environmental Quality's Regulations for Implementing the Procedural Provisions of NEPA. As a cooperating agency, your role in the NEPA process would include the following activities as they relate to your legal jurisdiction and / or area of expertise:

1) Identify issues related to your agency's jurisdiction by law and special expertise.
2) Assist the NPS and FHWA with identifying any issues or concerns regarding the project's potential environmental or socioeconomic impacts that could substantially delay or prevent an agency from granting a permit or other approval that is needed for the project.
3) Attendance at and input during agency coordination meetings and internal project team meetings and teleconferences.

4) Timely review and comment on the EA to reflect views and concerns of your agency on the adequacy of the document, significant issues to be evaluated, environmental impacts, study and assessment methodologies, range of alternatives, and proposed mitigation, if applicable.
5) Provide information for the EA that your agency requires to discharge your NEPA responsibilities and any other requirements regarding jurisdictional approvals, permits, licenses, and / or clearances.
6) Adoption of the EA, when needed to fulfill your independent NEPA obligations related to your Federal action and to reduce duplication with other Federal, State, Tribal and local procedures.

You have the right to expect that the EA will enable you to discharge your jurisdictional responsibilities. Likewise you have the obligation to tell us if, at any point in the process, your needs are not being met. We expect that at the end of the process, the EA and our public involvement process will satisfy your NEPA requirements.

Additionally, in accordance with the requirements of Section 106 of the National Historic Preservation Act (16 U.S.C. §470) of 1966 and implementing regulations (36 CFR Part 800), the NPS will consider the effects of this undertaking to historic properties. We would like to invite you to be a consulting party under Section 106 of the National Historic Preservation Act (NHPA). We anticipate that in this role, the Coast Guard would be a concurring signatory (not a signatory with responsibilities) to an anticipated Memorandum of Agreement (MOA) for the proposed project.

Please provide a written response indicating the Coast Guard's acceptance or denial of this invitation no later than 30 days from the receipt of this letter. If you accept, please identify the appropriate contact person within your organization for future coordination. If your agency declines, the response should state the reason(s) for declining the invitation.

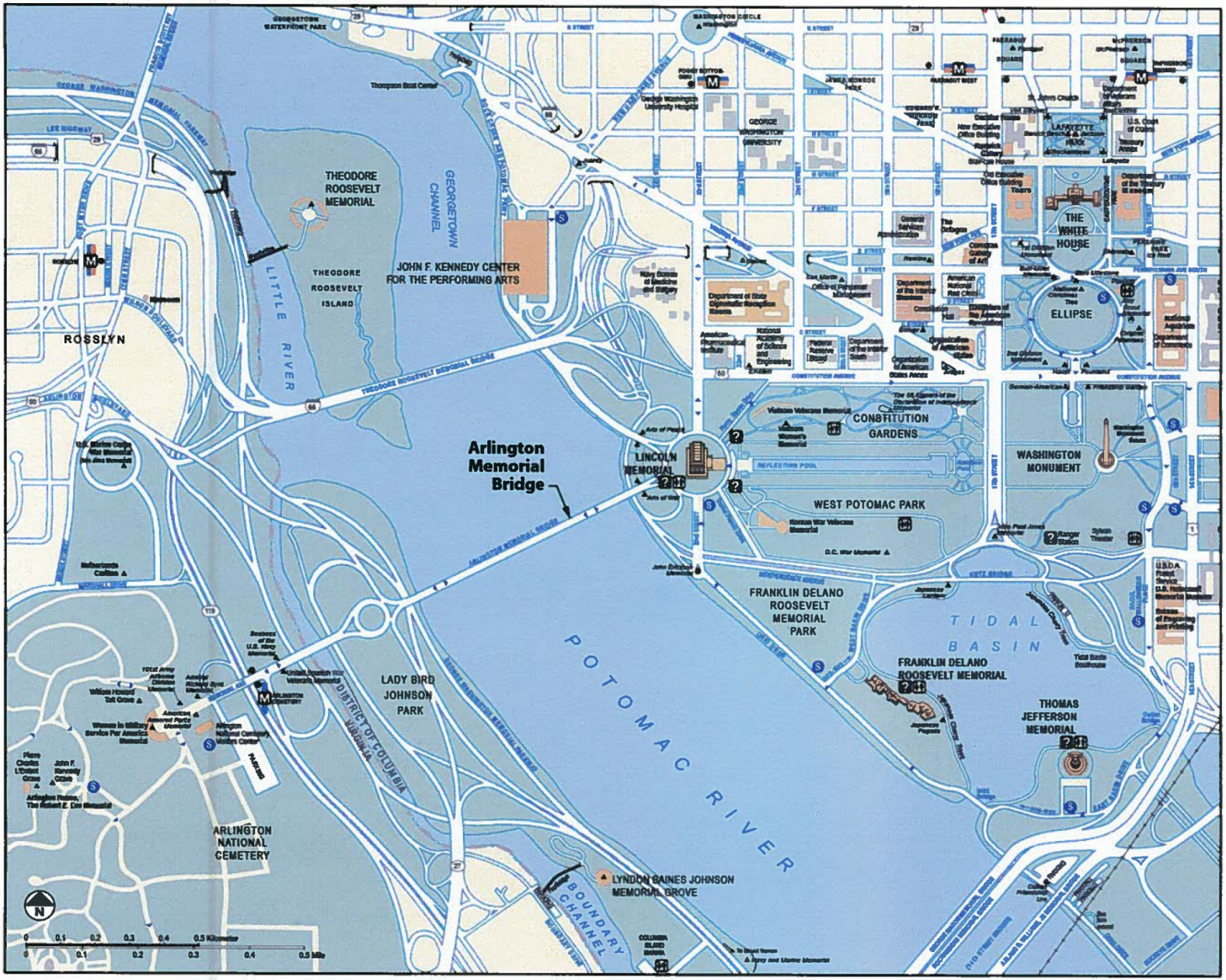
If you have any questions or would like to discuss our respective roles and responsibilities during the NEPA process in more detail, please contact Luis Teran at 703-419-6420 or luis_teran@nps.gov. Thank you for your cooperation and interest in this project.

Sincerely,

Alexcy Romero,
Superintendent

Enclosures: Project Location Map

cc: Waverly Gregory, Chief, Bridge Administration Branch
Jessica Shea, Bridge Management Specialist
Makayah Royal, NPS George Washington Memorial Parkway
Matthew Virta, NPS George Washington Memorial Parkway
Joel Gorder, NPS National Capital Region
Charles Borders, NPS Denver Service Center
Karen Arey, NPS Denver Service Center
Steve Culver, NPS Denver Service Center
Joan Glynn, Stantec Consulting Inc.


THEODORE ROOSEVELT MEMORIAL
GEORGETOWN CHANNEL
JOHN F. KENNEDY CENTER FOR THE PERFORMING ARTS
THEODORE ROOSEVELT ISLAND
LITTLE RIVER
ROSSLYN
THEODORE ROOSEVELT MEMORIAL BRIDGE
Arlington Memorial Bridge
ARLINGTON MEMORIAL BRIDGE
LINCOLN MEMORIAL
CONSTITUTION GARDENS
WASHINGTON MONUMENT
WEST POTOMAC PARK
FRANKLIN DELANO ROOSEVELT MEMORIAL PARK
TIDAL BASIN
FRANKLIN DELANO ROOSEVELT MEMORIAL
THOMAS JEFFERSON MEMORIAL
POTOMAC RIVER
LADY BIRD JOHNSON PARK
DISTRICT OF COLUMBIA
VIRGINIA
ARLINGTON NATIONAL CEMETERY
LYNDON BAINES JOHNSON MEMORIAL GROVE
BOUNDARY CHANNEL
THE WHITE HOUSE
ELLIPSE
GEORGE WASHINGTON UNIVERSITY
N
0 0.1 0.2 0.3 0.4 0.5 Kilometer
0 0.1 0.2 0.3 0.4 0.5 Mile

U.S. Department of Homeland Security

United States Coast Guard

Commander
United States Coast Guard
Fifth Coast Guard District

431 Crawford St
Portsmouth VA 23704-5004
Staff Symbol: (dpb)
Phone: (757) 398-6422
Fax: (757) 398-6334
Email: jessica.c.shea2@uscg.mil

18 JUL 2014

Mr. Alexcy Romero
Superintendent, National Park Service
George Washington Memorial Parkway
C/o Turkey Run Park
McLean, VA 22101

Dear Mr. Romero:

My apologies for the late response to your letter of June 12, 2014 regarding our participation in the development of the National Environmental Protection Act (NEPA) documentation for the proposed rehabilitation/reconstruction of the Arlington Memorial Bridge, located in Washington, DC, across the Potomac River.

As noted in your letter, the center span of the existing bridge includes a bascule span. The requirement listed in the drawbridge operating regulations outlined in 33 CFR 117.255 (b) states that the Arlington Memorial Bridge need not open for the passage of vessels. The distinction between a fixed bridge and a drawbridge that need not open is that a fixed bridge cannot open for the passage of vessels, where as a need not open drawbridge may be required to open. A new Coast Guard bridge permit is required if the reconstruction and rehabilitation efforts at Arlington Memorial Bridge will prohibit the bridge from being opened for the passage of vessels.

The Coast Guard will agree to be a cooperating agency for this proposed bridge project in accordance with the conditions specified in your letter. As a cooperation agency, we are prepared to work with you on executing and satisfying our responsibilities under NEPA. We expect that all navigational and other concerns will be addressed under appropriate sections of the Environmental Assessment.

Mrs. Jessica Shea has been assigned project manager for this office and she may be contacted at the above-listed address, telephone number or e-mail address.

Sincerely,

WAVERLY W. GREGORY, JR.
Bridge Program Manager
By direction of the Commander
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APPENDIX B: WETLAND STATEMENT OF FINDINGS

STATEMENT OF FINDINGS
FOR
EXECUTIVE ORDER 11990 (PROTECTION OF WETLANDS)

THE ARLINGTON MEMORIAL BRIDGE REHABILITATION
GEORGE WASHINGTON MEMORIAL PARKWAY

Recommended:

_____

Superintendent, George Washington Memorial Parkway Date

Certification of Technical Adequacy and Service-wide Consistency:

_____

Water Resources Division Date

Approved: _____

Regional Director, National Capital Region Date

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INTRODUCTION

Executive Order 11990 - Protection of Wetlands (Published in 1977) requires the National Park Service (NPS) and other federal agencies to evaluate the likely impacts of actions in wetlands. NPS Director's Order #77-1: *Wetland Protection* (effective October 2002) and Procedural Manual #77-1: *Wetland Protection* (reissued in January 2012) provides NPS policies and procedures for complying with Executive Order 11990.

Pursuant to the National Environmental Policy Act of 1969, Section 101(2)(C) as amended, the National Park Service, in cooperation with the Federal Highway Administration, is evaluating the proposed rehabilitation of the Arlington Memorial Bridge. The historic bridge spans the Potomac River between the National Mall in Washington, DC, and Arlington National Cemetery in Arlington County, Virginia. The bridge, administered by the George Washington Memorial Parkway, is an important element to both the regional transportation network and the monumental core of Washington, DC. The Arlington Memorial Bridge is in need of repair to restore the structural integrity of the bridge. Therefore an Environmental Assessment is being completed to evaluate the impacts of several proposed alternatives.

This Statement of Findings for Wetlands was prepared per Director's Order #77-1: *Wetland Protection* for the proposed Arlington Memorial Bridge Rehabilitation. A Statement of Findings has been completed because some of the proposed rehabilitation and reconstruction activities would take place in the Potomac River and would affect wetlands as defined by the National Park Service. The project area is shown in Figure B-1.

PURPOSE OF PROPOSED ACTION

The purpose of the proposed action is to restore the structural integrity of the Arlington Memorial Bridge while protecting and preserving, to the extent feasible, its memorial character and significant design elements. The Arlington Memorial Bridge is more than 80 years old and has never undergone a major rehabilitation. Several temporary repairs have kept it operational to meet the needs of the traveling public. However, like many other older highway bridges across the nation, this bridge needs comprehensive repair to ensure its ability to provide adequate traffic service for decades to come.

The Federal Highway Administration regularly inspects the bridge in accordance with industry standard structural engineering guidelines and standards. These detailed structural inspections and studies have identified significant amounts of corroded steel and deteriorated concrete. The most critical elements needing repair are the concrete spans and the steel bascule (drawbridge) span. Therefore, the project is needed to address the ongoing corrosion of steel structural members of the bascule span, deterioration of the concrete on the bridge's approach spans, and deterioration of the sidewalks and wearing surface.

While the bridge is still considered safe for travel, the superstructure is deteriorating at an accelerated pace. The National Park Service, at the recommendation of the Federal Highway

Administration, has posted a 10-ton load limit across the entire length of the bridge. The load restriction, which has eliminated most bus traffic, would remain in effect until such time as the permanent rehabilitation project is complete. As the bridge continues to deteriorate, the National Park Service and the Federal Highway Administration may impose further weight restrictions or close the bridge.

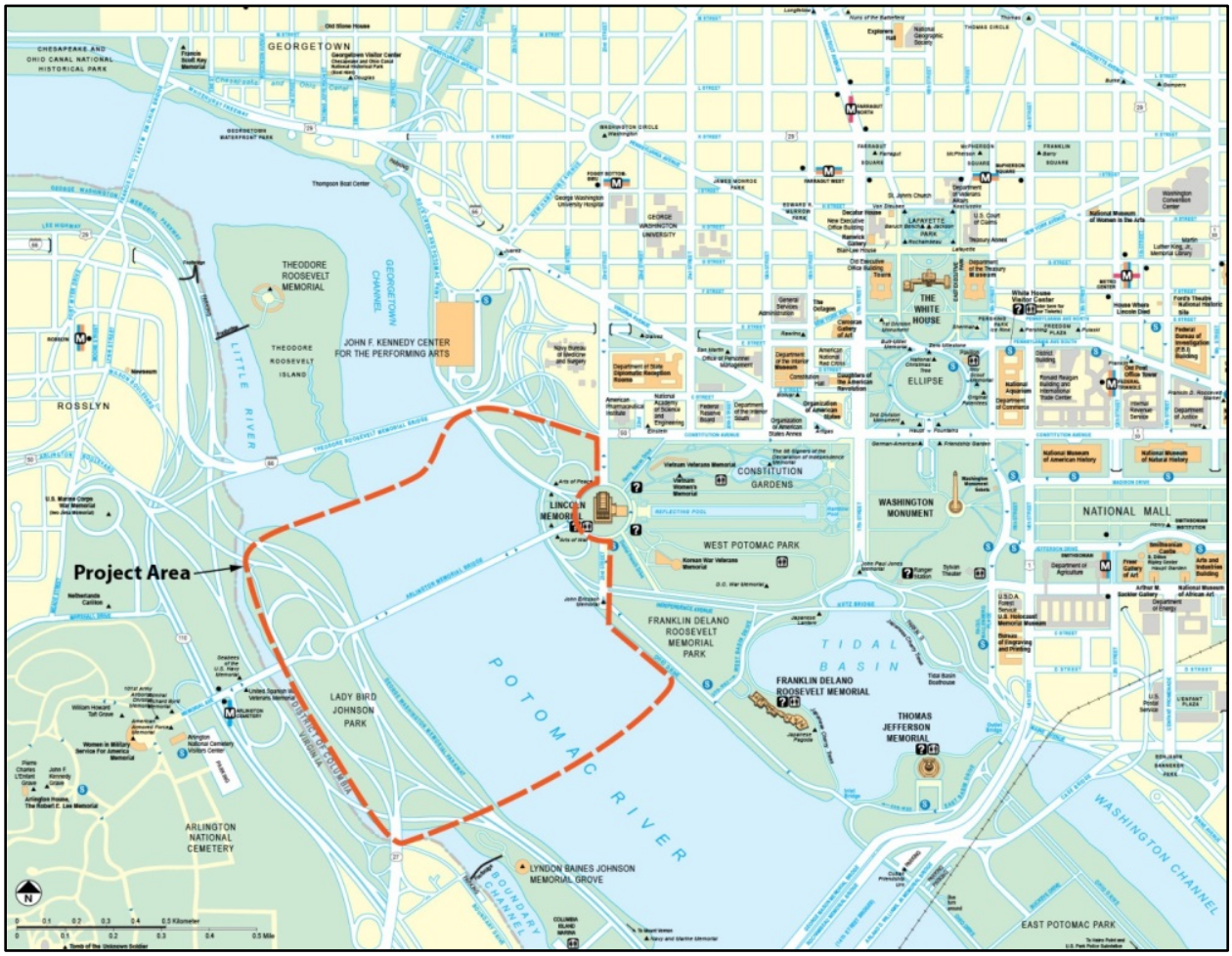

Figure B-1: Project Area Map

ALTERNATIVES

No-Action Alternative

The No-Action Alternative describes the action of continuing present management operations and conditions. While the No-Action Alternative does not meet the purpose and need of the project, it provides a basis for comparing the management direction and environmental consequences of the Action Alternatives.

Under the No-Action Alternative, the National Park Service and Federal Highway Administration would not perform a major rehabilitation project on the Arlington Memorial Bridge and therefore there would be no resulting wetland impacts. Under the No-Action Alternative the load restriction would remain in effect indefinitely as no major repairs would be made to the bridge.

Elements Common to the Action Alternatives

There are several construction elements that are common to all the Action Alternatives that have the potential to impact wetland/waters within the Potomac River.

Repairs to the Concrete Arch Spans. The Arlington Memorial Bridge consists of 10 reinforced concrete arch spans that require varying levels of structural repair. The work needed to rehabilitate the concrete spans includes replacing the concrete deck, filling cracks with epoxy, patching concrete spalling with concrete repair compound, and replacing the concrete edge beams.

Repairs to the Concrete Bridge Piers. Several concrete bridge piers have cracking and scouring surrounding the piers that require repair below water. In order for structural repairs to occur, cofferdams would be installed to dewater the area around the bridge piers. Cofferdams are installed into the substrate and provide a barrier around the site to keep water from entering. This allows concrete repairs to be completed in a dry working environment. Cracks in the bridge piers/abutments would be filled using an epoxy suitable for underwater applications and then wrapped with fiber reinforced polymer. Undermined footing areas would be filled with grout, and scouring would be addressed by placing scour countermeasures around the piers for protection.

Action Alternatives

The Environmental Assessment presents four Action Alternatives all of which include the rehabilitation and repair of the concrete spans and associated bridge features. The four alternatives evaluate different ways to repair/replace the bascule span.

Alternative 1A. Alternative 1A involves the replacement of the existing bascule span with a new fixed span comprised of precast concrete box girders. Alternative 1A includes two potential construction methodologies; Construction Methodology A which requires full closure of the bridge for a portion of the construction period, and Construction Methodology B which includes partial closure of the bridge during construction.

Alternative 1B (Preferred Alternative). Alternative 1B would include the replacement of the existing bascule span with a new fixed span comprised of variable depth steel girders. Alternative 1B would also use one of two construction methodologies as described in Alternative 1A. The preferred construction methodology is Method A.

Alternative 2. Alternative 2 consists of replacing the existing bascule span with a new fixed arch span of welded steel truss construction that would visually replicate the construction of the existing

span. Alternative 2 only has one possible construction methodology which includes full closure of the bridge for a portion of the construction period.

Alternative 3. Alternative 3 consists of repairing / rehabilitating all necessary elements of the existing bascule span in place. Alternative 3 construction methodology includes full closure of the bridge for a portion of the construction period.

The construction methodology would be determined by the selected contractor. The potential construction areas are described below. The preferred alternative includes construction activities within the upland staging areas, work zone which includes the causeway/platform area, Barge Staging Area 1 and the associated dredge area.

Upland Staging Areas

Four potential land-based staging areas, two on the west side of the bridge and two on the east side of the bridge may be used for any of the Action Alternatives. Staging Areas A, B, C and D are currently maintained grass areas that contain no jurisdictional wetlands.

Staging Areas within the Potomac River

Barge Staging Area 1 (Preferred Alternative). Barge Staging Area 1 would be used under all of the Action Alternatives and is located downstream from the bridge along the west bank of the Potomac River and the George Washington Memorial Parkway see Figure B-2. Approximately 225,000 square feet (5.2 acres) of area would be needed to accommodate the barges that would access this staging area. Barges would be secured with spud anchors, and a temporary piling-supported platform may be constructed for access to the barge from land.

Due to the shallow depths of the Potomac River within Barge Staging Area 1 access route, dredging of the river would be necessary (see Figure B-2 for river bathymetry). Approximately 10,000 cubic yards of sediment over an 11.2-acre surface area would need to be dredged to a depth of approximately 15 feet from the current river surface. Dredging activities would avoid areas where underwater cables and potential shipwrecks are located. Dredge material would be tested for contaminants and properly disposed of at an appropriate location determined by the contractor and with the approval of the Federal Highway Administration.

Barge Staging Area 2. Barge Staging Area 2 would be used for Alternatives 1A and 1B using Construction Method B which would allow the bridge to remain open to vehicular traffic for the duration of the construction. Approximately 100,000 square feet (2.3 acres) of area would be needed to accommodate the barges that would access Barge Staging Area 2.

Similar to Barge Staging Area 1, dredging would be required within the Barge Staging Area 2 access route. Approximately 80,000 cubic yards of dredge material over a 6.2-acre area would need to be dredge to a depth of approximately 15 feet from the current river surface. Dredging activities would avoid areas where underwater cables are located and the material would be tested for contaminants

and properly disposed of at an appropriate location with the approval of the Federal Highway Administration.

Causeways. Up to four temporary causeways would be constructed from the east and west shores of the Potomac River. The causeways would extend between 250 and 750 feet into the river parallel to the north and south sides of the bridge. A filter fabric would be laid on the bottom of the river and the causeway built on top of the fabric. Appropriately sized pipes would be placed through the causeway to allow the river to continue to flow through the area. When construction activities are complete, the causeways would be removed and the river bottom restored to its current condition.

Work Platforms. Up to four temporary docks would be constructed from the east and west shores of the Potomac River to be used as work platforms. The docks would be built on temporary pilings and would extend approximately 250 to 750 feet into the river parallel to the north and south sides of the bridge. When construction activities are complete, the dock/work platforms would be removed and the river bottom restored to its current condition.

TEMPORARY TRUNNION SHORING

Regardless of the alternative selected, including the No-Action Alternative, immediate repairs to the bridge are needed. Each leaf of the bascule span consists of two main steel trusses that are supported by an axle, or trunnion, that rests on trunnion posts, which carry the load of the bridge down to the bridge abutments. Because the trunnion posts are critical to the structural integrity of the bascule span and due to the continuing deterioration of steel within the trunnion posts, temporary repairs to the posts are needed by approximately 2017. Under this action, Federal Highway Administration would install a shoring system to provide additional strength to the trunnions.

Installation of the shoring system would extend approximately 6 feet on each side of the trunnion posts. Depending on design, pilings may need to be placed in the Potomac River to support the bascule span during the period of these trunnion post repairs. These pilings would be placed in deep water and would not impact NPS defined wetlands/waters.

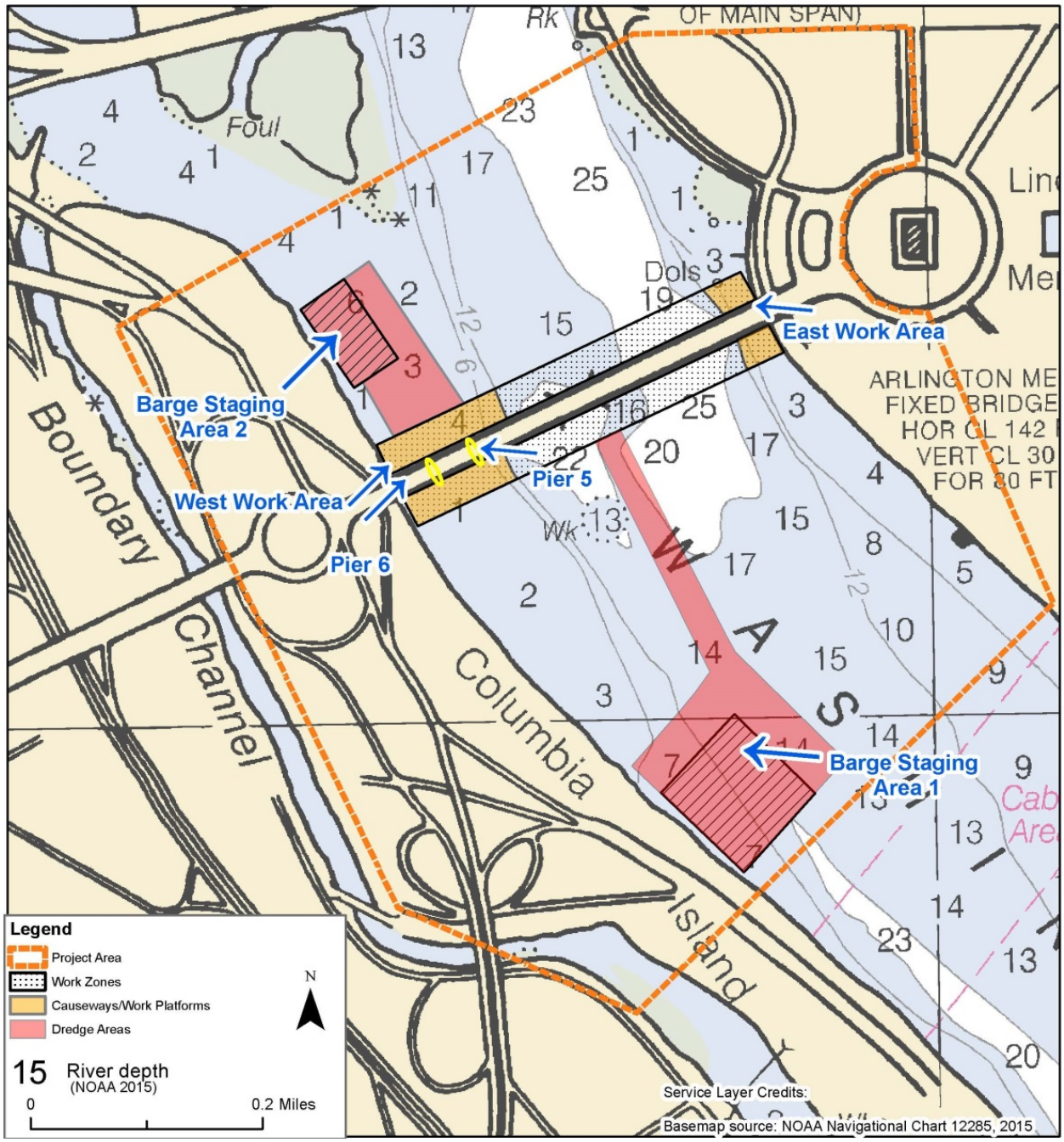

Figure B-2: Proposed Work Areas within the Potomac River

SITE DESCRIPTION

Wetlands

Wetlands associated with this project area are limited to the riverine habitat within the Potomac River below the mean high water line. The Potomac River is considered a riverine wetland, specifically Riverine Tidal Unconsolidated Bottom Vegetated (R1UBV) (USDOI 1979). The riverine system includes both wetland and deep water habitat. The boundary between wetland and deep water habitat in the riverine systems lies at a depth of 6.6 feet below low water (USDOI 1979).

Wetland Assessment Methodology

A wetland assessment was completed by a professional wetland scientist for the entire project area including the areas that lie outside the Potomac River. The wetland assessment utilized the Cowardin system from *The Classification of Wetlands and Deepwater Habitats of the United States* and the 1987 Corp of Engineers Wetland Delineation Manual and the Regional Supplement for the Atlantic and Gulf Coast Plain Region (USDOI 1979).

The wetland assessment verified that jurisdictional wetlands do not occur outside of the boundaries of the Potomac River. The Potomac River is considered jurisdictional by the National Park Service according to Procedural Manual #77-1: *Wetland Protection* including the unconsolidated bottom habitat and submerged aquatic vegetation (SAV) from a depth of 8 feet and shallower. The US Army Corp of Engineers also claims jurisdiction over the Potomac River as a navigable waterway. Actions that may reduce or degrade wetlands are governed by Section 404 of the Clean Water Act and Section 10 of the Rivers and the Harbors Act. At the federal level, the US Army Corps of Engineers regulates activities in navigable waters of the United States, which includes jurisdictional wetlands. In addition, within the District of Columbia, the Department of Energy and Environment is responsible for issuing water quality certifications and would therefore regulate waters within the Potomac within the boundaries of the District of Columbia.

Submerged aquatic vegetation was delineated using the most recent 2014 SAV data layer provided by the Virginia Institute of Marine Science (VIMS). The Virginia Institute of Marine Science is an established and reputable program that has been mapping submerged aquatic vegetation since the late 1970s. The SAV program uses fly-over aerial photography and ground-truthing information, when available, to map SAV beds within the Chesapeake Bay and its tributaries (VIMS, 2014).

In addition to delineating the SAV bed boundaries, the Virginia Institute of Marine Science provides an estimate of SAV density within each bed. This is accomplished by visually comparing each bed to an enlarged crown density scale similar to those utilized for estimating crown cover of forest trees from aerial photography. Bed density is categorized into four classes based on a subjective comparison with the density scale. The four categories include: 1) very sparse (<10% coverage); 2) sparse (10 to 40%); 3) moderate (40 to 70%); or 4) dense (70 to 100%). The classification is assigned to the whole bed or the bed is divided into subsections if there is variation in coverage (VIMS, 2014).

Wetlands within the Project Area

Wetlands in the project area are limited to deepwater and wetland riverine habitat within the Potomac River. By definition, the NPS jurisdictional wetland habitat is located along both the eastern and western shorelines in areas less than 8 feet in depth. The wetland habitat consists of both SAV beds and unconsolidated bottom habitat.

Established beds of submerged aquatic vegetation are located along the western and eastern shorelines of the river. The 2014 data for these beds is preliminary, but the outline of the beds was available for reference although the coverage and composition has not yet been released. During a previous survey in 2013, the bed along the western shoreline was characterized as having 70 to 100% coverage. According to the Maryland Department of Natural Resources, hydrilla (*Hydrilla verticillata)*, coontail (*Ceratophyllum demersum*) and watermilfoil (*Myriophyllum spicatum*) were the most frequently reported of the eight common species found during ground-truthing by citizens and the US Geological Survey (MDDNR 2015). The bed along the eastern shoreline was not identified during the 2013 mapping effort; therefore, the coverage and composition are unknown. Figure B-3 shows the location of the submerged aquatic vegetation as mapped by the Virginia Institute of Marine Science.

The areas not mapped as submerged aquatic vegetation are understood to be unconsolidated bottom habitat, which is most prevalent in this type of environment. There are no other mapped habitat types, such as oyster beds, in the vicinity of the project area. The upper Potomac River is considered a non-shellfish area by the Maryland Department of the Environment (MDDOE 2015).

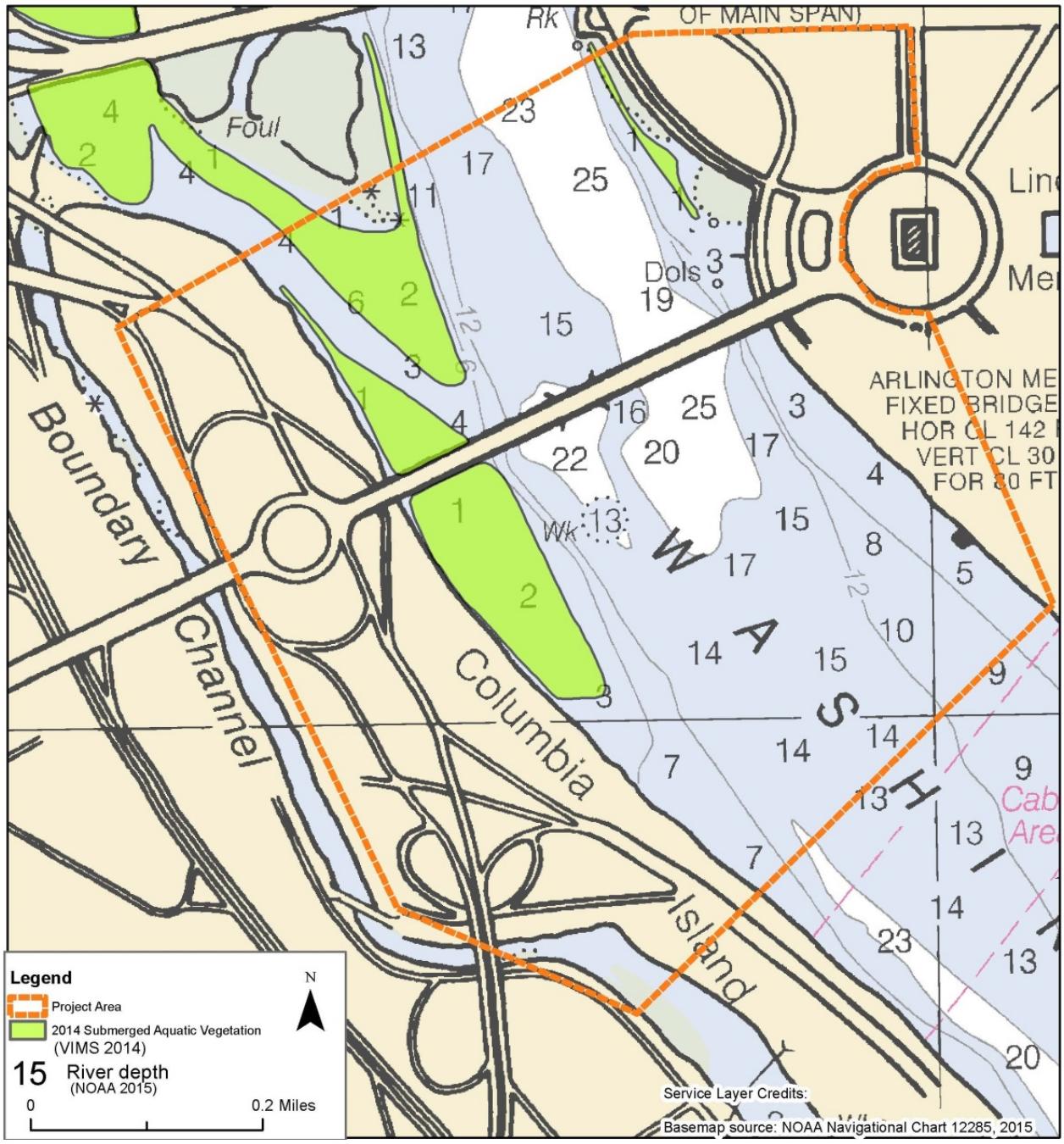

Figure B-3: Location of SAV beds

EVALUATION OF WETLAND FUNCTIONS AND VALUES

Submerged Aquatic Vegetation Beds

The SAV beds within the Potomac are understood to be high quality beds based on the coverage and information received from the Virginia Institute of Marine Science. Submerged aquatic vegetation provides a series of functions including habitat, water quality enhancement, and sediment stability. SAV beds provide habitat for a number of species. Crab and fish species find protective nurseries in bay grass beds. Microscopic zooplankton, an important component of the food chain, feed on the decaying bay grasses, thereby keeping the bed healthy and free of waste. Bay grass stems and leaves are often covered with small invertebrates that attach to and feed on the grass. In addition to marine species, migratory waterfowl feed on bay grasses and the animals that live in the bay grass beds (Chesapeake Bay Program 2012a).

Submerged aquatic vegetation is an ecological indicator of water quality that provides a quick and visible monitoring method for water quality degradation. Ecosystem services of submerged aquatic vegetation include absorption of nitrogen and phosphorus, release of dissolved oxygen from photosynthesis, sediment trapping, and reduce excess nutrients that would otherwise further impair the Chesapeake Bay watershed (Chesapeake Bay Program 2012a).

SAV beds attenuate wave action and water velocity which decreases turbidity in the water column and can benefit the animals in the area as well the submerged aquatic vegetation itself. The submerged aquatic vegetation acts as a natural filter which traps sediment reducing adverse impacts of sedimentation. The roots of the vegetation provide stability at the bottom of the Bay and its tributaries thereby reducing erosion and further sediment pollution (Virginia Department of Education 2013).

Unconsolidated Bottom Habitat

Although focus is often placed on SAV beds, soft sediment habitat is typically the most common habitat type in bays and estuaries. Unconsolidated bottom habitats include environments where the bottom consists of fine grain sediments, sand and mud. Their biodiversity and productivity vary depending upon depth, light exposure, temperature, sediment grain size and abundance of microalgae and bacteria (Ocean Health Index 2015). This habitat typically supports high densities of clams, worms, crustaceans, and other benthic invertebrates. Benthic microalgae are also present in this habitat when shallow enough that light can penetrate to the bottom (VIMS 2015). The organisms that dwell in this habitat are important to the overall food chain and diversity of the system.

IMPACTS TO WETLANDS/WATERS

Potential impacts to the wetlands within the Potomac River related to the Arlington Memorial Bridge Rehabilitation are anticipated to be both temporary and permanent. Permanent and temporary impacts resulting from dredge and fill activities were calculated for National Park Service

jurisdictional area less than 8 feet in depth within the impacted areas. The preferred alternative (Alternative 1B) and associated construction methodology would include temporary and permanent impacts within the work zone, Barge Staging Areas 1 and 2, and the associated dredge footprint. Temporary impacts would result from construction activities, while permanent impacts would result from bridge pier stabilization.

Temporary impact calculations have been determined for both submerged aquatic vegetation and unconsolidated bottom habitat for areas that would be disturbed under all of the Action Alternatives (e.g. barge staging areas and associated dredge areas, the east and west causeway/platform areas, and the areas where scour countermeasures would be placed) (see Table 1). It is assumed that the entire area within these areas would be temporarily impacted in order to account for all possible construction activities. Due to the assumption that the entire area within the work areas outlined above could be potentially impacted it was not necessary to calculate impacts from specific activities such as cofferdams. Figure B-4 graphically represents the impact areas presented in Table B-1.

TABLE B-1. PREFERRED ALTERNATIVE TEMPORARY AND PERMANENT IMPACT TOTALS

Impact Area	Total Impacts			
	Temporary Submerged Aquatic Vegetation (Acres)	Permanent Submerged Aquatic Vegetation (Acres)	Temporary Unconsolidated Bottom (Acres)	Permanent Unconsolidated Bottom (Acres)
Barge Staging Area 1	0.0	0.0	2.6	0.0
East Causeway/Platform Area	0.0	0.0	1.3	0.0
West Causeway/Platform Area	2.7	0.0	1.2	0.0
Scour Countermeasures (Pier #5 and #6)	0.0	1.4	0.0	0.0
Barge Staging Area 2	3.3	0.0	2.9	0.0
Total Impact	6.0	1.4	8.0	0.0

Permanent wetland impacts are limited to the scour countermeasures that could be installed at the base of the bridge piers. The necessity of the installation of the countermeasures would be based on the extent of damage and scour observed around each individual pier. The calculations are limited to the two piers on the western side of the bridge (Pier #5 and #6) that are located in NPS defined Wetlands. Table B-2 demonstrates the total permanent impacts resulting from the scour countermeasures which were calculated using the guidelines outlined in *Publication No. FHWA-NHI-09-112, Design Guidelines 11: Rock Riprap at Bridge Piers*. Standard riprap scour countermeasure dimensions where used to calculate the total impact along with the size of the piers.

TABLE B-2. IMPACTS RESULTING FROM SCOUR COUNTERMEASURES

	Pier Width	Riprap scour Placement Width (ft)	Area of Pier (sf)	Total Area (sf)	Area of Scour Protection (sf)	Area of Scour Protection (ac)
Pier 5	28	56	3,724	34,300	30,576	0.70
Pier 6	27	54	3,591	34,464	30,464	0.70
Total					61,040	1.40

Approximately 1.4 acres of SAV habitat would be impacted around Pier #5 and #6. It is understood that this area is currently colonized by submerged aquatic vegetation based on the information gathered from the Virginia Institute of Marine Science.

JUSTIFICATION FOR THE USE OF WETLANDS

The purpose of the project is to restore the structural integrity of the Arlington Memorial Bridge. The project is needed to address the ongoing corrosion of steel structural members of the bascule span, deterioration of the concrete on the bridge's approach spans, and deterioration of the sidewalks and wearing surface.

Impacts to the Potomac River result from several site and construction limitations. Due to the weight of some equipment and bridge materials including precast concrete bridge decking and the new bascule span, they cannot be moved over land and brought onto the bridge utilizing the existing bridge superstructure; rather they must be brought to the bridge via the Potomac River. Because of the shallow water depths on both sides of the Potomac River approaching and surrounding the bridge, dredging is necessary to move the equipment and materials to and within the bridge work zone. In addition, some work on the bridge must be performed from below the bridge deck, and causeways or work platforms in the shallow portions of the river are needed to hold equipment for this work. In addition, scour countermeasures are needed to protect bridge piers. Piers 5 and 6 are located in wetland areas and the scour countermeasures for these two piers must be placed within these wetlands.

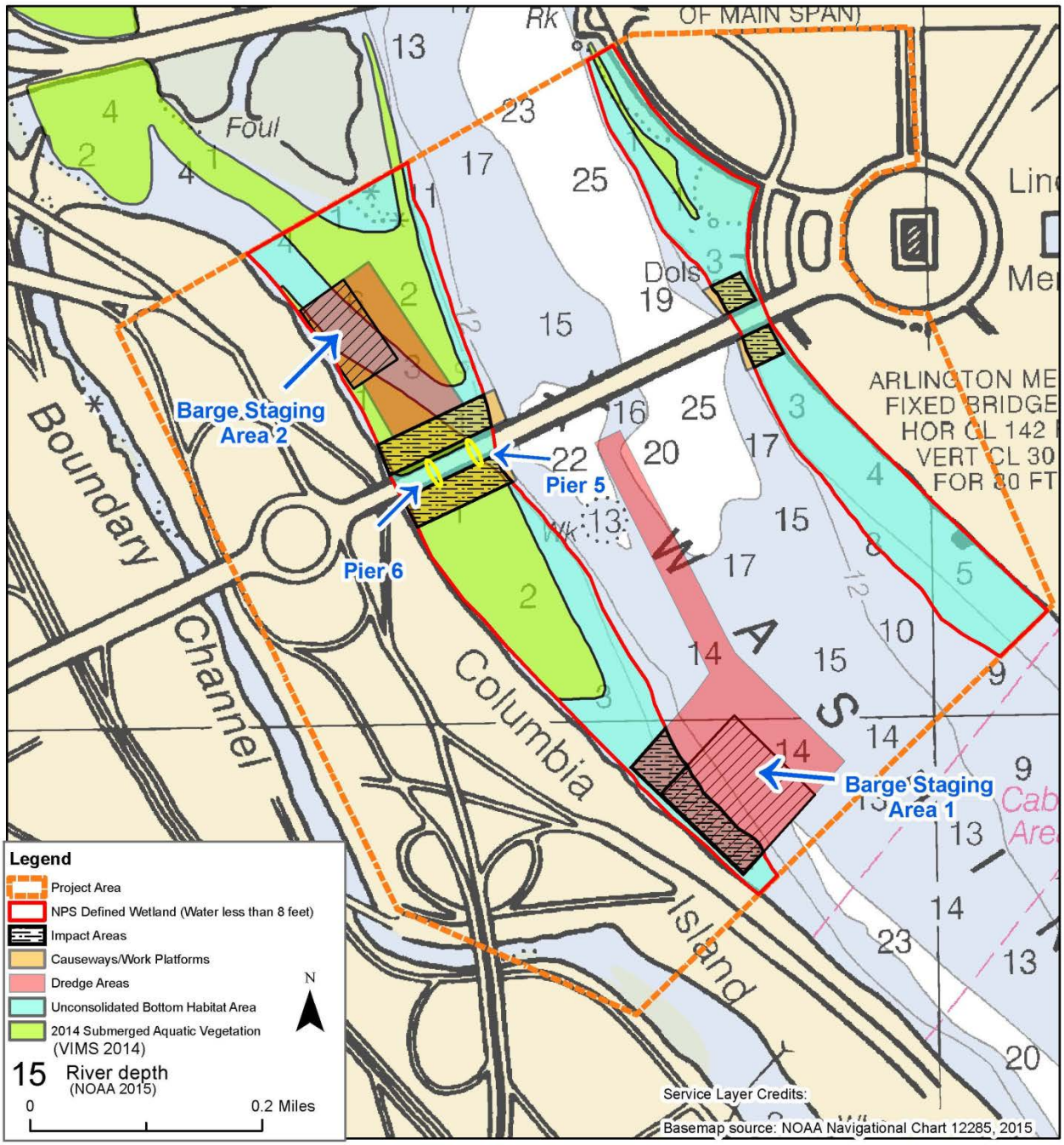

Figure B-4: Wetland Impact Areas

MITIGATION MEASURES

The activity of rehabilitating the bridge would result in unavoidable impacts to 15.4 acres of riverine wetlands (7.4 acres of submerged aquatic vegetation and to 8.0 acres of unconsolidated bottom wetlands). The construction contractor would be encouraged to minimize impacts to wetlands where feasible, and construction methodologies would need to be approved by the National Park Service and the Federal Highway Administration.

In accordance with Procedural Manual #77-1, mitigation is required for both temporary and permanent impacts. No compensatory mitigation for impacts to unconsolidated bottom wetland areas would be required. The 8.0 acres of disturbed unconsolidated bottom area would be restored to pre-disturbance elevations and recolonization of invertebrates and other substrate fauna is expected to occur rapidly.

Mitigation measures for temporary impacts to submerged aquatic vegetation would include restoration of the areas to pre-construction elevations and re-establishing submerged aquatic vegetation in the areas previously colonized. The areas would be replanted with the same species composition and planted to a greater density of plant cover than what existed prior to disturbance.

Compensatory mitigation would be undertaken for impacts to submerged aquatic vegetation at a 2:1 ratio for all permanent and temporary impacts. A compensatory mitigation plan would be developed before the project begins and approved by NPS, Water Resources Division staff. The applicant would identify existing areas of submerged aquatic vegetation within the river, that have medium to low cover density submerged aquatic vegetation, and that can be enhanced by infill planting of the same species. The areas would be planted with the same species composition and planted to a density of plant cover that would infill to a high level of canopy density.

The preferred alternative requires compensatory mitigation for 1.4 acres of temporary impacts and 6.0 acres of permanent impacts within the causeway/platform areas, Barge Staging Areas 1 and 2, and associated dredging area. The construction contractor may propose to avoid utilizing Barge Staging Area 2. However, the assumption at this point is that Barge Staging Area 2 would be dredged.

The construction contractor would be required to develop a restoration plan approved by the NPS and obtain all required regulatory permits. A total of 14.8 acres of existing, degraded submerged aquatic vegetation habitat would be identified for vegetation restoration. The areas proposed for compensation would be within NPS regulation boundaries, i.e. within reaches of the Potomac and/or the Anacostia river that are under NPS management. The areas designated for compensatory mitigation would need to be assessed for potential impacts to natural and cultural resources including potential for impacts to underwater archeology. It is understood that additional mitigation may be required by the US Army Corp of Engineers or the DC Department of Energy and the Environment.

The submerged aquatic vegetation restoration plan would include a description of how restoration enhancement areas were selected and the parameters used to select the most appropriate areas for

replanting (including location within the riverine system, water chemistry, hydraulic and geomorphologic conditions at the sites; and the individual species present, species density and cover, and delineation of the replanting areas). The plan would also include planting/seeding, 5-year monitoring plans, and a contingency replanting plan to ensure successful reestablishment. The details of this plan would be formulated once a submerged aquatic vegetation survey is completed during the permitting phase of the project and the current species makeup and percent cover is known.

Submerged Aquatic Vegetation Restoration Opportunities

The National Park Service has investigated possible in-kind mitigation opportunities within the Potomac and Anacostia rivers to restore submerged aquatic vegetation. Potential sites have been identified within the Potomac River based on depth and locations in which grasses historically occurred. The 2010 SAV maps from the Virginia Institute of Marine Science were used to identify areas within the Potomac that were previously colonized by submerged aquatic vegetation. These areas were then further refined to only include locations within the boundaries of NPS jurisdiction and within a river depth of 6 feet or less. The potential sites along the Anacostia were identified based only on the boundaries of NPS jurisdiction and river depth because SAV coverage has not been present, with the exception of some small patches in 1993, since 1971. The Virginia Institute of Marine Science does not have historic SAV data available for the Potomac River or Anacostia River dating earlier than 1971.

It has been documented that submerged aquatic vegetation within the Chesapeake Bay area are limited to waters less than 6.0-foot depth due to their light requirements. This was used as a guidance to preliminarily select potential restoration locations with the understanding that light availability is site specific and depends largely on localized water quality parameters. Water quality parameters such as dissolved inorganic nitrogen and phosphorus, water column light attenuation coefficient, planktonic chlorophyll and total suspended solids affect not only SAV physiology and ecology but also strongly influence the plant's light climate. It is important to recognize that easily available water clarity data obtained from a secchi disk does not take into account light attenuation by epiphytes on SAV leaves which is a dominant factor in regulating plant growth (Kemp, et al 2004).

Mitigation for SAV impacts resulting from the Woodrow Wilson Bridge project included planting 90,000 shoots of eelgrass (*Zostera marina*) at Piney point in the lower Potomac River estuary. The planting occurred between 2003 to 2005 and was completely gone by the end of the summer of 2007. Prior to planting, the project team undertook extensive analysis including a habitat evaluation using a Preliminary Transplant Suitability Index and test to determine the likelihood of success. The suitability index looked at historical SAV distribution, current SAV distribution, water depth, water quality, sediment composition, proximity to natural bed, and shoreline configurations. The transplant grass experienced season summer mortality which is common in the Chesapeake due to the large seasonal temperature fluctuations, but unlike natural beds the grass never recovered. The failure is attributed to high temperatures, hypoxic conditions, low percent light at leaf level and a heavy epiphyte load (Chesapeake Bay Program 2010).

The localized water quality plays a large role in the design of the restoration plan (i.e. which species to plant) and the ultimate success of the restoration. In addition to the parameters previously discussed, salinity is important in deciding which species to plant and varies within the different reaches of the Potomac and Anacostia Rivers. Salinity tolerances have been established for the most commonly found species in Chesapeake Bay and its tributaries. Although generally understood for the Potomac and Anacostia Rivers, salinity can vary seasonally and experience large fluctuation resulting from high rain years. It has been hypothesized that this was also the cause of failure for a 2002 seagrass transplant that was being monitored by the US Geologic Survey in 2003 and 2004 in the mesohaline waters of the Potomac River. This was a transplanting project for the destruction of 33.7 acres of submerged aquatic vegetation in Alexandria, Virginia. The transplanted eelgrass was completely gone by the end of 2004 and it was determined that water clarity and light penetration were sufficient. The transplant failure may be attributed to above average precipitation which drove salinity below eelgrass tolerance limits (10 ppt) percent of the time at the transplant site. Other factors that have could have contributed to the failure includes low sediment nutrient concentration and poor substrate (Schenk and Rybicki 2006).

Some shallow areas that meet the water quality requirements are subject to high currents and wave action or contain sediments that are high in organic content and may not have potential for SAV growth. Therefore it is important to have a complete understanding of the area sediment composition and water velocity. Areas historically colonized with submerged aquatic vegetation are much more likely to have the necessary growth conditions. It is important to recognize that conditions could have changed and that there is likely a reason that they are no longer present in that area.

A decline in water quality has been identified as the primary cause for the overall decline in submerged aquatic vegetation in the lower Potomac River and Chesapeake Bay in the last century. Due to this a large component of the overall Bay restoration plan includes measures to improve overall water quality by decreasing nutrients and suspended solids. Since 2000, the overall SAV restoration goal established by the Chesapeake Bay Program has been decreasing. Between 2003 and 2013 approximately 173 acres of grasses were planted in the Chesapeake Bay and have met mixed success. The National Oceanic and Atmospheric Administration's Chesapeake Bay Office and US Army Corps of Engineers Engineer and Research and development Center have funded almost all of the large-scale plantings in the region. They have since not been able to increase funding enough to meet the annual planting need. Large scale bay grass plantings have become rarer as the managers continuing to evaluate the best and most cost-effective methods for planting bay grasses (Chesapeake Bay Program 2012b).

Potomac River Mitigation Opportunities

As discussed above, Chesapeake Bay SAV restoration efforts have focused on the mesohaline portion of the Potomac River. There were a number of federally funded restoration projects conducted by the US Army Corp of Engineers and the National Oceanic and Atmospheric Administration between 2003 and 2006 that included the planting of 32.75 acres of eelgrass in the Potomac River. Several different collection and planting methodologies were employed with mixed results. The potential

sites identified for this project include this area but also the areas upstream closer in location to the project area.

Figure B-5 provides a key to the maps that follow. Figure B-6 through Figure B-10 show the potential restoration areas identified based on previous SAV colonization and depth. A total of 882 acres has been identified.

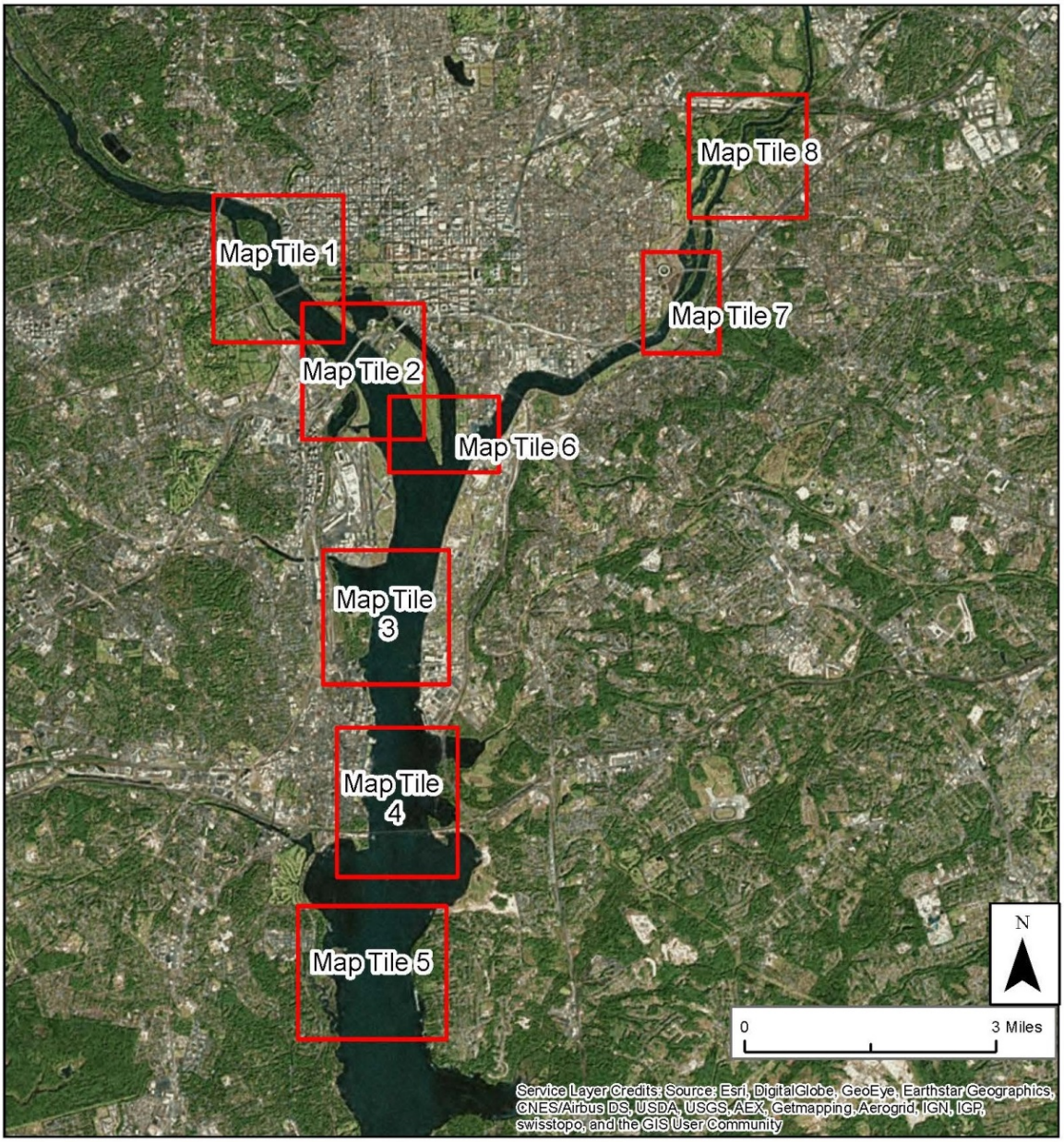

Figure B-5: Key to SAV Restoration Opportunity Maps

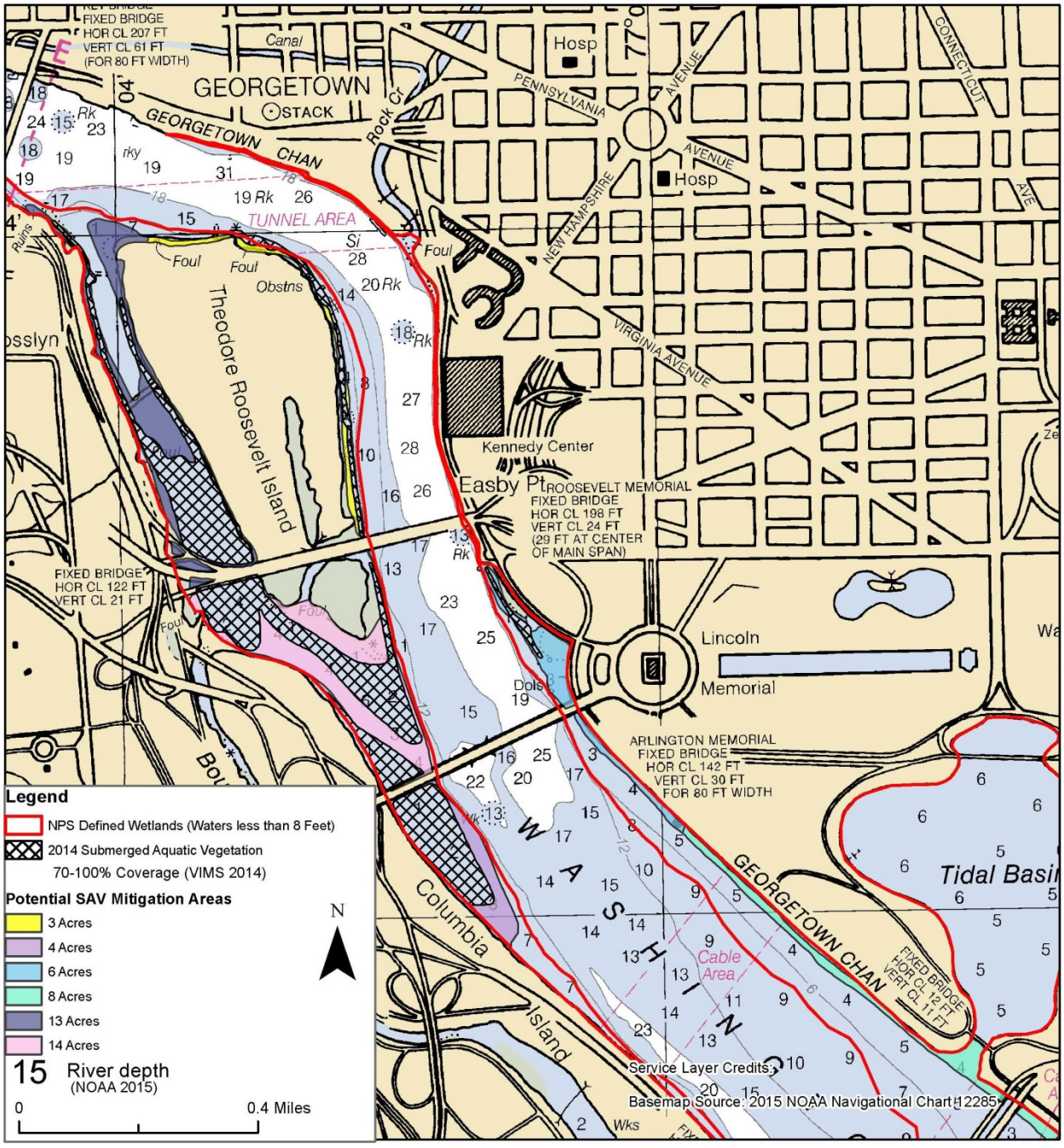

Figure B-6: Tile #1-Potential SAV Mitigation Opportunities

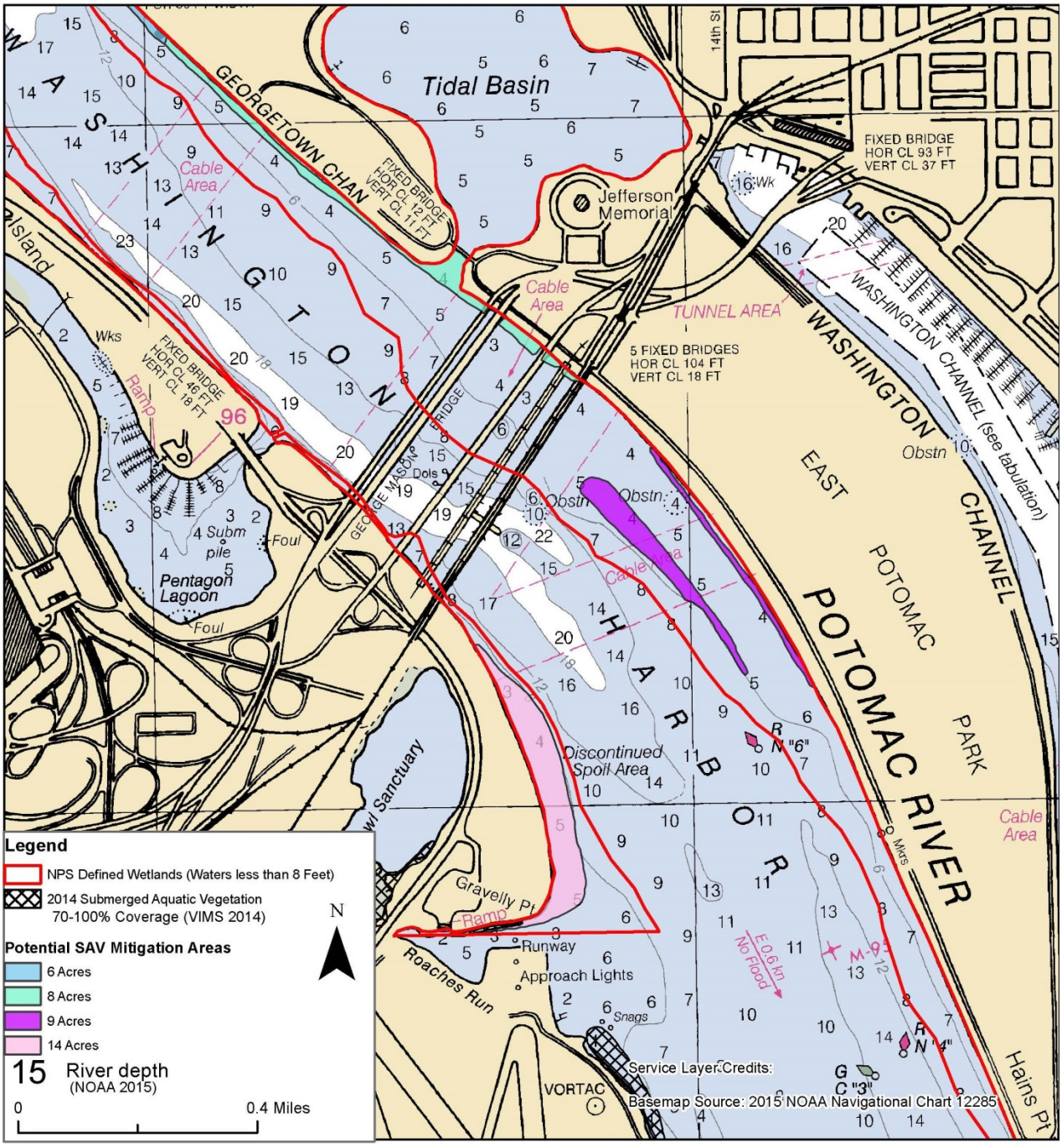

Figure B-7: Tile #2-Potential SAV Mitigation Opportunities

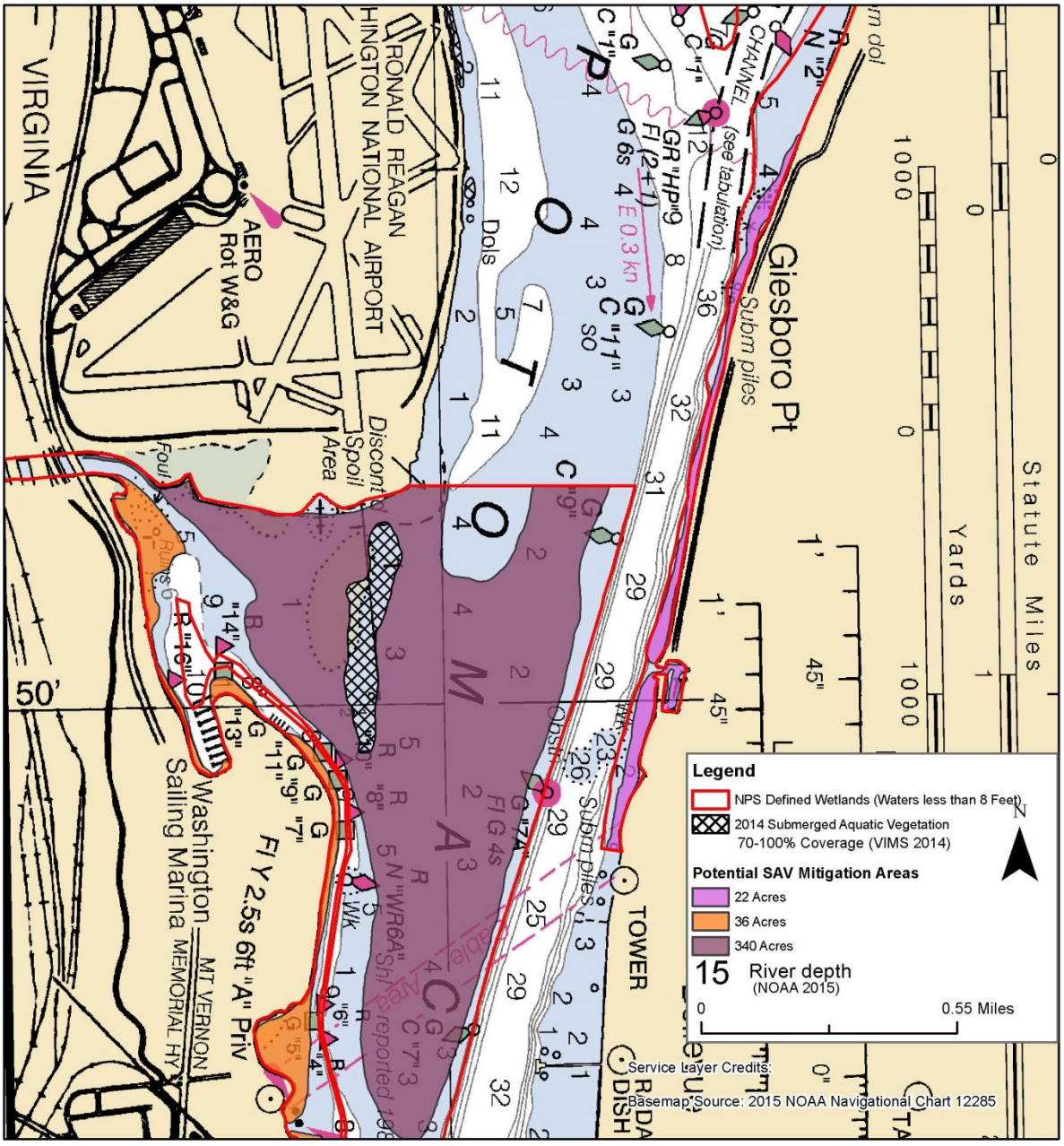

Figure B-8: Tile #3-Potential SAV Mitigation Opportunities

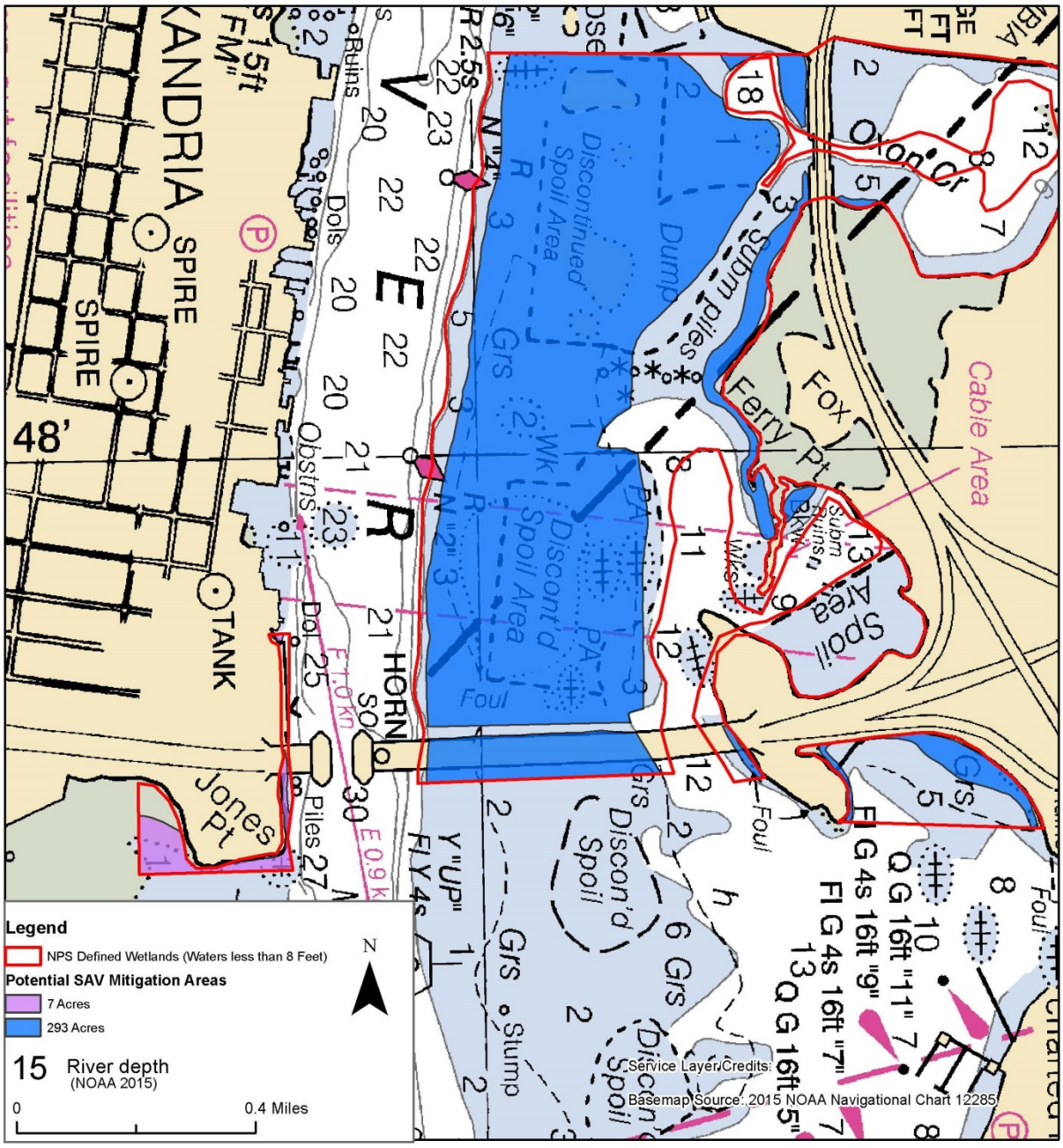

Figure B-9: Tile #4-Potential SAV Mitigation Opportunities

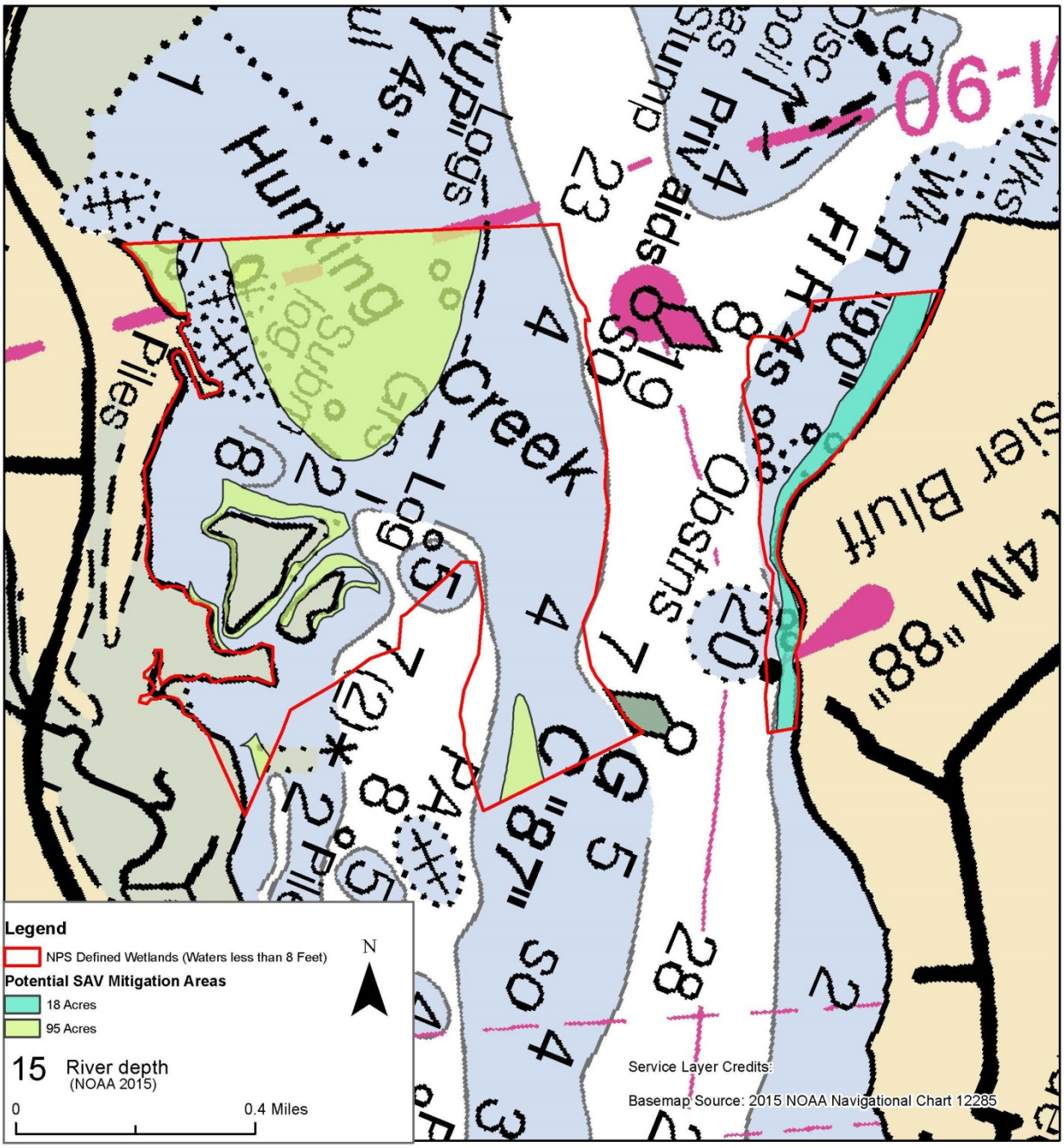

Figure B-10: Tile #5-Potential SAV Mitigation Opportunities

Anacostia River Mitigation Opportunities

The Anacostia River has been devoid of submerged aquatic vegetation since before 1971 as demonstrated by the VIMS historical aerial maps. The absence is largely attributed to poor water quality. High levels of suspended solids and nutrients flow into the Anacostia River from the surrounding watershed. Restoration efforts have focused almost exclusively on improving the water quality of the system. Recently the Anacostia Watershed Society has received a permit to establish a 400 square foot test bed in the tidal Anacostia primarily wild celery (*Vallisneria Americana*). Due to the infancy of the research in establishing grass beds within the Anacostia River it is important to understand the risks. Extensive data would be necessary to further understand the water quality, light penetration, water velocity, and sediment composition. Potential locations based only on water depth have been called out on Figure B-11 and Figure B-12. A total of 240 acres has been identified.

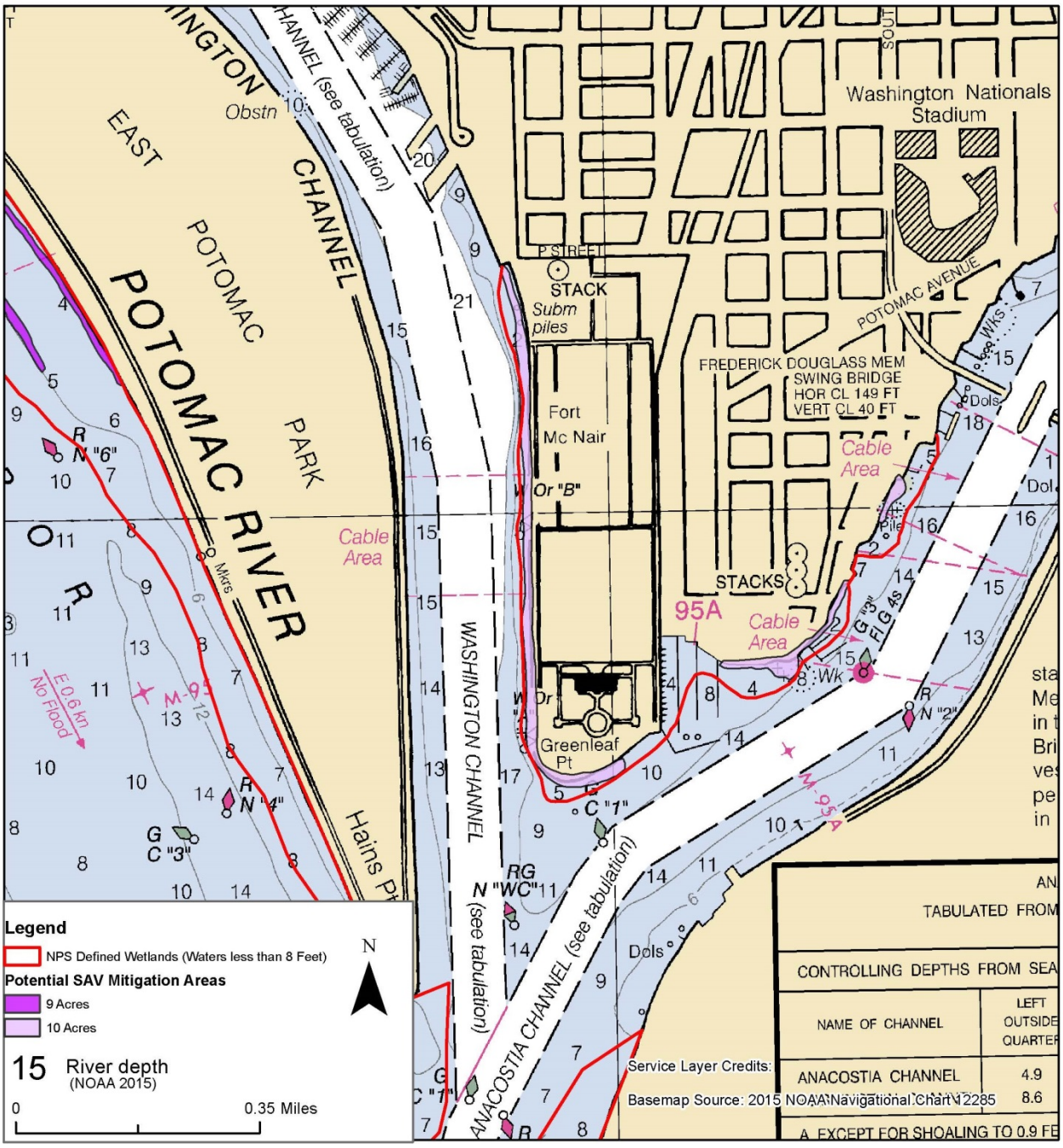

Figure B-11: Tile #6-Potential SAV Mitigation Opportunities

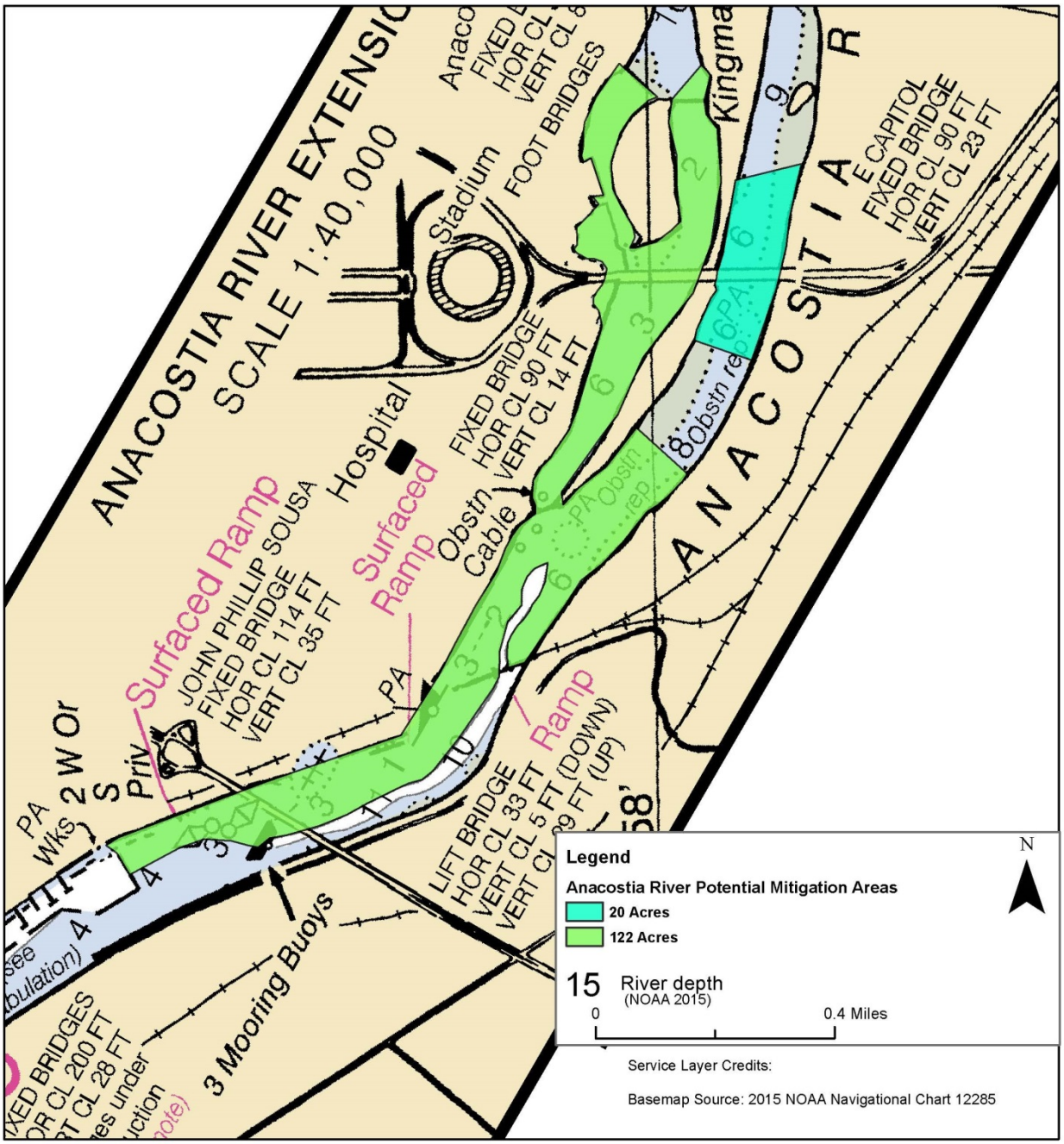

Figure B-12: Tile #7-Potential SAV Mitigation Opportunities

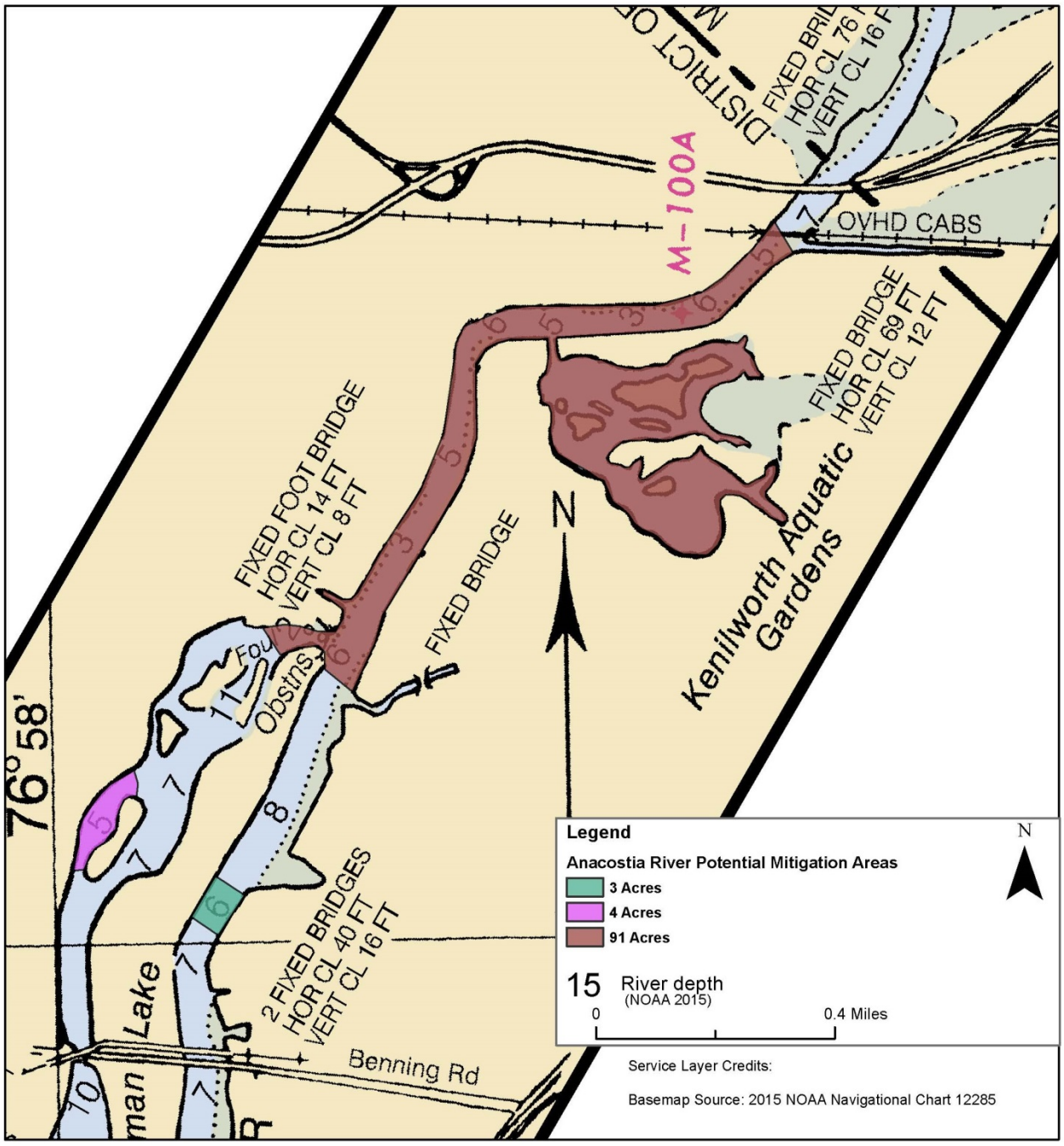

Figure B-13: Tile #8-Potential SAV Mitigation Opportunities

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As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

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