

**ESSENTIAL FISH HABITAT ASSESSMENT  
FOR THE  
SOUTHWEST WATERFRONT REDEVELOPMENT PROJECT**

**WASHINGTON SHIP CHANNEL, WASHINGTON, DISTRICT OF COLUMBIA**

March 2012

Pursuant to Section 305 (b)(2) of the Magnusson-Stevens Fishery Conservation and Management Act, the U.S. Army Corps of Engineers (USACE) is required to prepare an Essential Fish Habitat (EFH) Assessment for all proposed actions that occur within coastal waters of the United States. This assessment is being prepared to address the impacts of the Southwest Waterfront Redevelopment (“the Wharf”) proposed by a public-private partnership between Hoffman-Madison Waterfront, LLC, and the District of Columbia’s Office of the Deputy Mayor for Planning and Economic Development (the Applicants). The project is located in southwest Washington, D.C. along and within the Washington Ship Channel. Based on the prescribed protocol for preparation of an EFH Assessment, this assessment is comprised of the following components:

1. A description of the proposed action;
2. A listing of the life stages of all species with EFH designated in the project area;
3. An analysis of the effects of the proposed action;
4. The Federal agency’s opinions regarding the effects of the proposed action; and.
5. Proposed mitigation, if applicable.

The USACE is seeking National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) concurrence on the determinations made in this report.

**I. DESCRIPTION OF PROPOSED ACTION**

**A. Purpose**

The Applicants are proposing to construct a major new mixed-used urban development designed to enliven and reactivate the Southwest Waterfront.

**B. Description of the Proposed Action**

The proposed project (“the Wharf”) is located in Washington, DC, along and within the Washington Ship Channel. The boundaries of the property run generally from 11th Street east to 6th Street between Maine Avenue and the Washington Channel. The site has approximately 22.1 acres of land area and approximately 18.8 acres of riparian area (See Figure 1 and Attachment A).

The upland portion of the \$1.5 billion project will include approximately 3,000,000 square feet (gross) of new floor area construction. Proposed upland uses include approximately:

- 675,000 square feet of space devoted to mixed-income residential uses;
- 450,000 square feet of space devoted to housing;
- 925,000 of office space;
- 450,000 square feet of hotel space;
- 200,000 square feet devoted to retail uses;
- 100,000 square feet devoted to cultural activities; and
- 20,000 square feet of space devoted to recreational programs.

The waterside components of the project include five new public-access piers, two independent marinas, “day-use” docks, moorings and the replacement of a majority of the waterfront seawall. A brief summary of the new waterside elements includes: (Figure 2):

- **Market Pier and Market Docks:** 6,150 square feet of fixed concrete pier and 80 temporary and “day use” public access floating docks;
- **Transit Pier:** 20,470 square feet of fixed of fixed concrete pier and 19 floating slips for Intermodal transportation;
- **District Pier:** 26,600 square feet of fixed concrete pier and 8 floating docks for visiting historical, cultural, and military ships;
- **Capital Yacht Club:** 3,700 square feet of fixed pier and 102 floating docks for the Nation’s oldest yacht club;
- **7th Street Pier:** 20,520 square feet of fixed pier and 2,950 square feet of floating dock intended to provide small-craft recreational opportunities and bring the public to the water;
- **Gangplank Marina:** 6,600 square feet of new fixed concrete pier and 234 floating docks for liveaboards and recreational boaters;
- **Commercial Pier:** 62,030 square feet of new fixed concrete pier and 4 slips to support dinner cruise ships;
- **Pier 4:** residential opportunities on the existing fixed concrete pier as well as 30 slips on floating docks;
- **East Potomac Park Day Use Dock:** 800 square feet of floating public access dock;
- **Mooring Field:** 266,000 square feet of space for approximately 40 dual point moorings;
- **Floating Wetland:** creation of a 2,455 square foot floating wetland; and
- **Seawall Replacement/Repair:** 240 feet of seawall replacement and 2,873 feet of maintenance and repair of existing seawall.

The in-water components of the project will consist of:

- The installation of 783 24-inch square, precast concrete piles to support fixed piers;
- The installation of approximately 74 12-inch diameter, 178 16-inch diameter, and 85 18-inch diameter steel guide piles;
- Open water fill of 3,840 square feet as a result of sea wall repair and replacement; and
- Creation of a 2,455 square foot floating wetland.

## C. PROJECT AREA

“The Wharf” would be located within southwest Washington, D.C., along the Washington Ship Channel, near its confluence with the Anacostia and Potomac Rivers (Figure 1). The project is located south of interstate 396 and across the Channel from East Potomac Park.

The Washington Ship Channel connects to the Anacostia and Potomac Rivers to the south and also connects to the Potomac River through the Tidal Basin just north of the Channel. The Channel is tidally influenced and is considered to be tidal freshwater and generally has salinities below 0.5 parts per thousand (ppt). Water depths in the project area range from approximately 15.7 to 26.1 feet mean lower low water (MLLW) (Attachment B).

Surface water use designations in the District of Columbia are:

- A – Primary contact recreation
- B – Secondary contact recreation and aesthetic enjoyment
- C – Protection and propagation of fish, shellfish, and wildlife
- D – Protection of human health related to the consumption of fish and shellfish
- E – Navigation

Based on the District’s 2010 Integrated Report [District Department of the Environment (DDOE) 2010 and DDOE 2012], uses C and E are fully supported in the Washington Ship Channel. There is insufficient information to determine if primary contact recreation (use A) is supported. Protection of human health related to the consumption of fish and shellfish (use D) is not supported in the Washington Ship Channel. This use is not supported because of a fish consumption advisory throughout the District that recommends not consuming catfish, carp, and eel and limiting consumption of other fish captured within the District. Secondary contact recreation and aesthetic enjoyment (use B) were not assessed for the Channel.

The Washington Ship Channel including the project area is included on the 303(d) list of impaired waters and is listed for the following impairments: pH, bacteria, and organics (DDOE 2010 and DDOE 2012). For 2008-2009 the average count of *E. coli* for the Washington Ship Channel was 36 most probable number (MPN)/100 mL. DDOE has detected toxins within sediments in the Channel. Chlordane and PSBs have been detected in elevated levels within fish tissue samples collected in the Channel. Other surveys of benthos in the Channel document a “severely stressed benthic community” (DDOE 2010 and DDOE 2012).

There is no shallow water habitat (SWH) within the project area and, therefore, the project area does not support submerged aquatic vegetation (SAV). There has been SAV documented in the Washington Ship Channel near Fort McNair (Figure 1), which is located southeast of the project area, but not in the last four years [Virginia Institute of Marine Science (VIMS) 2012]. SAV was found in one area near Fort McNair in 2006. VIMS SAV maps from 2006 through 2010 are included as Attachment C.

## II. Species with EFH in the Project Area

The National Marine Fisheries Service (NMFS) has summary designations for various tributaries within the Chesapeake Bay. There is a summary designation for the Potomac River, which the Washington Ship Channel and which the Channel converges with (Figure 1). The following species have EFH within the Potomac River:

- King mackerel (*Scomberomorus cavalla*);
- Spanish mackerel (*Scomberomorus maculatus*);
- Cobia (*Rachycentron canadum*);
- Red drum (*Sciaenops ocellatus*);
- Bluefish (*Pomatomus saltatrix*) (only in salinities from 0.5 ppt to 25 ppt);
- Windowpane flounder (*Scopthalmus aquosus*) (only in salinities from 0.5 ppt to 25 ppt); and
- Summer flounder (*Paralichthys dentatus*) (only in salinities from 0.5 ppt to 25 ppt).

According to John Nichols of NMFS (personal communication 7 February 2012), the confluence of the Washington Ship Channel and the Potomac River is located upstream of the area of salinity intrusion within the Potomac. The area of salinity intrusion is the area with designated EFH within the tidal Potomac River (Nichols, personal communication 2012). Though the Channel does not provide habitat for EFH species, the area does provide habitat for migratory fish species, which are prey for federally-managed species within the Chesapeake Bay, such as bluefish (*Pomatomus saltatrix*) and summer flounder (*Paralichthys dentatus*). There are important prey species for federally-managed species within the project vicinity. As identified by Mr. Nichols (personal communication 7 February 2012), these prey species of interest are:

- American shad (*Alosa sapidissima*);
- Blueback herring (*Alosa aestivalis*);
- Alewife (*Alosa pseudoharengus*);
- White perch (*Morone americana*);
- Yellow perch (*Perca flavescens*); and
- Striped bass (*Morone saxatilis*).

This EFH assessment only addresses impacts to prey species and associated cumulative impacts to prey species and EFH species. No impacts to managed EFH species, EFH, or Habitat of Particular Concern (HAPC) would be expected because the project area is upstream of the salinity intrusion, which is necessary to support EFH species.

## III. Effects of the Proposed Action

### A. Impacts to Prey Species

#### 1. Construction

Construction of the proposed project would consist of the construction of 16 new piers and docks and the replacement of 240 feet linear feet of sea wall and maintenance and repair of 2,873 linear

feet of seawall. In order to support the new piers and docks, several existing piers will be removed, repaired, or retrofitted. The two main impacts would be associated with fill of open water and generation of turbidity and pressure waves during pile driving to support pier installation.

Approximately 3,840 square feet of open water within the Washington Ship Channel would be filled along the shoreline. This fill would constitute a permanent loss of open water habitat and this habitat would no longer be available for use by prey species for bluefish and flounder, including: shad, herring, alewife, white perch, and yellow perch. This area would also constitute a permanent loss of benthic habitat, which may provide foraging area for some of these prey species.

Installation of piles during pier construction and repair would result in temporary increases in turbidity and suspended sediment in the local area. These increases would temporarily impair the ability of sight-feeding fish, including the species of interest, to feed. Resettling of suspended sediments may also smother fish eggs, larvae, and some benthic prey species that may be within the turbidity plume. Resuspension of sediments may also cause a temporary, localized increase in water column nutrient or chemical concentrations.

Construction activities would cause a disturbance to the water column that would cause mobile organisms to avoid the project area during in-water activities. Some benthic fish would be less able to avoid construction activities. Fish and mobile benthic organisms would likely return to remaining open water habitat after in-water activities are complete.

A total area of 418,275 square feet of new piers and docks would be created by the proposed project. The new piers and docks would replace an existing 119,480 square feet of existing piers and docks. The net increase in shaded water column habitat is approximately 298,795 square feet (approximately 6.7 acres). These facilities would shade the water column directly underneath them, which may permanently decrease primary productivity in these areas and affect growth of photosynthetic organisms. These organisms serve as food for EFH prey species and the prey of those prey species.

Installation of new piles would create hard substrate that may provide habitat for epibenthic organisms. The total area of potential epibenthic habitat created by the piles would be approximately 153,000 square feet (3.5 acres). This would support organisms that filter feed and may provide some improvement in water quality and clarity in the immediate area.

The loss of habitat and shading of water column is negligible when considered relative to the total area of habitat provided by the Washington Ship Channel and the greater Anacostia River and Potomac River watersheds. The Washington Ship Channel alone covers approximately 200 acres. This loss of habitat would be somewhat offset by the creation of epibenthic habitat on the piles constructed to support the piers and docks. The project area consists of benthic and fish communities that are common in the Potomac River and the area does not provide unique or significant habitat for fish or benthos. The project would affect a relatively small portion of the potential habitat for EFH prey organisms within the Chesapeake Bay watershed. No population-level effects to EFH prey species, including American shad, blueback herring, alewife, white perch, and yellow perch, are expected.

The project will also create a 2,455 square foot floating wetland. This wetland will mimic a natural wetland by providing a concentrated habitat area composed of substrate floating on the surface made up of millions of tiny fibers, creating far more surface area for microbial habitat. The floating portion of the wetland may be planted with vegetation and the roots of these organisms will also then provide habitat for microbes. Many of the organisms that grow and develop on the floating wetland assist with filtering of the water column and this floating wetland may provide benefits to water quality by removing suspended particles from the water column.

## **2. Operation**

The proposed project would not have any ongoing or permanent in-water activities. There may be some increase in recreation and commercial ship traffic to the area to the marinas constructed as part of the project. The project will collect stormwater from up to the 3.2-inch storm event across the project area in a cistern and then utilize that water for on-site purposes. The project will also collect stormwater drainage from the access road, adjacent roadways and lawns into a series of rain gardens, managing the stormwater flow to restore natural hydrological patterns. These stormwater management actions will reduce stormwater pollutant loadings into the Washington Channel.

No other direct adverse effects to prey species beyond the water column shading discussed above are anticipated. No direct impacts to habitat or in-water resources for prey organisms are expected to occur as a result of ongoing use of “the Wharf.”

## **B. Cumulative Impacts**

Other projects that may potentially affect in-water areas in the project vicinity are:

- Relocation of the North Boat House at Ronald Reagan Washington National Airport (DCA);
- Runway 1-19 RSA Enhancements at DCA;
- District of Columbia Water and Sewer Authority Long Term Control Plan (LTCP) – Combined Sewer Overflow (CSO) Control Program; and
- Runway 33 safety area expansion at DCA.

The relocation of the North Boat House would consist of demolishing the existing River Rescue Boathouse, and constructing a new North River Rescue Boat House between Runways 4-22 and 15-33, with an area of approximately 2,025 square feet. The project would also construct a debris and ice break wall, and construct a levee road by-pass. This project would result in unavoidable disturbance to portions of the Potomac River containing common biotic communities and would include minor impacts to SAV. Impacts to SAV for the Boathouse Relocation would be offset by the removal of the existing boathouse and cessation of maintenance dredging activities. Best management practices (BMPs) would be adopted to minimize impacts during construction of the facility, including minimization of turbidity impacts.

The construction of the RSA for Runway 1-19 would extend the pavement and associated in-pavement lighting of the runway 300 feet over an existing land area to the south of the existing runway. Of the proposed actions, only the repair of the Approach Light Sequential Flash (ALSF) pier and relocation of the approach light system would include in-water components. Work at the existing ALSF pier would consist of replacement of the 175 existing support timber piles for the pier with new tubular steel piles and removal of a portion of the existing pier. Relocation of the approach light system would consist of placement of additional piles to support three relocated approach light bars at the 800-foot, 900-foot, and 1,000-foot positions along the ALSF pier. These relocated approach light bars would be similar to those currently in place on land immediately north of the pier.

The purpose of the LTCP is to bring all CSO discharges to the Anacostia and Potomac Rivers and Rock Creek into compliance with the technology-based and water quality-based requirements of the Clean Water Act (CWA). The project would also control surface and basement flooding in the Northeast Boundary Area of the District. The LTCP controls for CSOs consist of a system of deep tunnels together with appurtenant facilities to capture, store and convey flow from the existing combined sewers to the advanced wastewater treatment plant at Blue Plains. This project would include some temporary in-water construction activities across the Potomac River from DCA adjacent to Bolling Air Force Base.

The relocation of the North Boat House and construction of the runway safety area (RSA) for Runway 1-19 were both determined to have no significant impacts in environmental assessments and findings of no significant impact (FONSI) that were issued for each project (MWAA 2010a and MWAA 2010b). In-water work for other areas at DCA would also increase turbidity and disturb water column and benthic habitat. These impacts would be temporary and would have a negligible impact on prey organisms and habitat for prey organisms in the region. Facilities are being removed from the water column as part of both projects, which would offset the area of habitat lost for those projects. The facilities constructed as part of the Runway 1-19 RSA and boathouse relocation are consistent with existing uses and structures in the area.

In-water construction activities adjacent to Bolling Air Force base would occur behind a cofferdam and after construction of the cofferdam, the impacts to in-water habitat would be negligible. There would be a temporary loss of habitat behind the cofferdam during dewater and construction activities, but this area would return as open water habitat after construction is complete. The area of permanent change associated with new shoreline structures would be negligible.

The fill of open water within the Potomac River to support the Runway 33 RSA would affect approximately 5.3 acres of Potomac River bottom during site preparation activities (MWAA 2010c). The area would then be filled to the elevation of the adjacent upland area with material structurally suitable to support the RSA. Project impacts to aquatic resources would result from site preparation and completely filling an area of 3.8 acres and partially filling an additional 1.5 acres, as part of the slope of the dike around the main fill area. Temporary, adverse impacts to the prey resources may occur as a result of site preparation and construction activities. These impacts may result from the loss of benthos due to excavation or placement of fill and permanent loss of 3.8 acres of open water habitat. Forage fish and macroinvertebrates would be displaced from the construction area. Fish and macroinvertebrates are expected to return to the remaining

open water in the project area after construction is complete. A small portion of the water column, relative to the overall size of the Potomac River, would be replaced with fill.

Maintenance dredging is not completed on the Washington Ship Channel, even though it is a federal channel. The proposed project would reduce the federal channel width. There would be no physical changes to the Washington Ship Channel as part of this change in designation. Authorization of this change is under review by congress.

Although there are other in-water projects occurring in the project vicinity that would be expected to cause disturbance to bottom habitat and construct structures within the water column, cumulatively these projects would affect a relatively small portion of the overall potential habitat for EFH prey organisms within the Washington Ship Channel, Anacostia River, Potomac River and Chesapeake Bay Watershed. No population-level effects to EFH prey species, including American shad, herring, alewife, white perch, and yellow perch are expected.

#### **IV. Mitigation**

Discussions are ongoing with the U.S. Army Corps of Engineers (Corps) and other agencies to determine what mitigation measures may be appropriate to offset impacts that could not be avoided. Mitigation will be determined through the Corps permitting process.

#### **V. Federal Agency's Opinion on Project Impacts**

In summary:

1. No EFH, EFH species, or habitat of particular concern (HAPC) is found within the project area. However, prey organisms for EFH species may be using aquatic habitat in the project area.
2. Project impacts to aquatic resources would be the result of filling an area of 3,540 square feet of open water along the shoreline during seawall repair and construction and installation of 783 24-inch square, precast concrete piles to support fixed piers and 74 12-inch diameter, 178 16-inch diameter, and 85 18-inch steel guide piles to support floating docks.
3. Temporary impacts to water quality may occur during construction. Localized turbidity plumes and elevated concentrations of nutrients and other constituents may occur during installation of piles.
4. Temporary, adverse impacts to the prey resources may occur as result of the loss of benthos due to fill and permanent loss of approximately 3,589 square feet of open water habitat and installation of approximately 1,120 piles. Forage fish and macroinvertebrates would be displaced from the construction area. Fish and macroinvertebrates are expected to return or relocate to the remaining open water in the project area after construction is complete. A small portion of the water column, relative to the overall size of the Washington Ship Channel, would be replaced with fill or piles.
5. The project area does not support submerged aquatic vegetation due to the lack of shallow water habitat.
6. The project would permanently shade an additional approximately 299,000 square feet of open water, which may adversely affect photosynthetic organisms in this portion of the



Channel. There may be trophic effects associated with this area of water column shading, however, this area is relatively small when compared with the total area of the Washington Ship Channel, so no population level adverse effects are expected.

7. The project would create approximately 153,000 square feet of epibenthic habitat along the pile constructed to support the piers and docks. This would benefit epibenthic organisms, which may also have long-term benefits to water quality as a result of increased populations of filter-feeding organisms.
8. The project would create a 2,455 square foot floating wetland providing habitat for wetland plants, microbes, and other aquatic organisms.
9. Implementation of stormwater management actions will reduce stormwater pollutant loadings into the Washington Channel by collecting the water and re-using it onsite.
10. Although there are other in-water projects occurring in the project vicinity that are expected to cause disturbance to bottom habitat and create permanent structures within the water column, cumulatively these projects would affect a negligible portion of the potential habitat for EFH prey organisms within the Washington Ship Channel, Anacostia River, Potomac River, and Chesapeake Bay Watershed. No population-level effects to EFH prey species, including American shad, herring, alewife, white perch, yellow perch, and striped bass are expected.

The USACE has determined, after reviewing relevant fisheries information and analyzing potential project impacts, that the proposed project would not adversely affect EFH or EFH species and would have negligible impacts to EFH prey species. The USACE is requesting concurrence with this determination from NMFS.

## **VI. References**

District Department of the Environment (DDOE). 2010. 2010 Integrated Report to the Environmental Protection Agency and U.S. Congress Pursuant to Sections 305(b) and 303(d) Clean Water Act (P.L. 97-117). September.

District Department of the Environment (DDOE). 2012. Draft 2012 Integrated Report to the Environmental Protection Agency and U.S. Congress Pursuant to Sections 305(b) and 303(d) Clean Water Act (P.L. 97-117). February

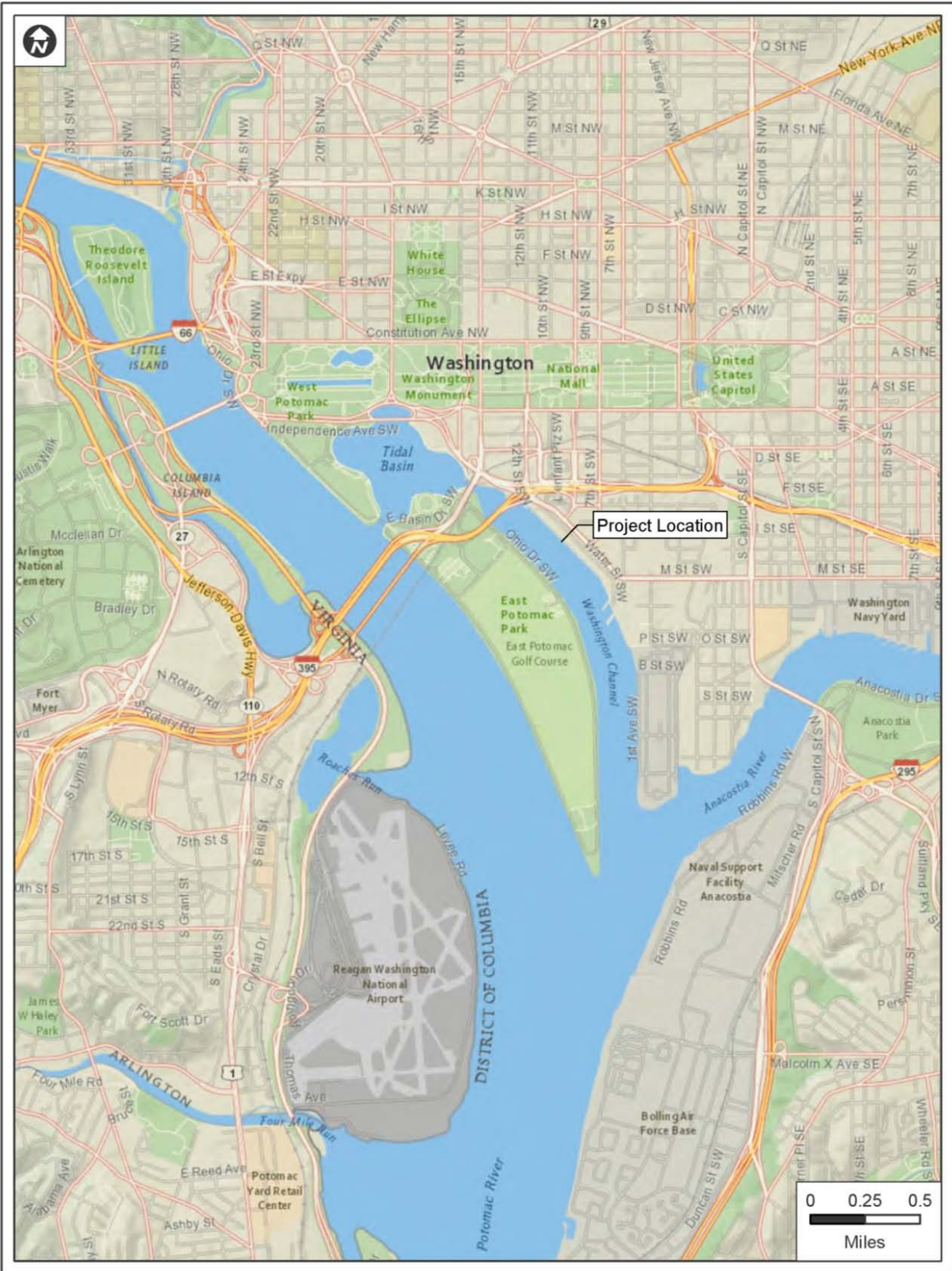
Metropolitan Washington Airports Authority. 2010a. *Notice of Availability, Final Environmental Assessment and Finding of No Significant Impact for River Rescue North Boathouse Relocation*. Online: <http://www.mwaa.com/3374.htm>.

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Metropolitan Washington Airports Authority. 2010c. *Draft Environmental Assessment, Runway 4-22 and Runway 15-33 Runway Safety Area Enhancements*. November.

Nichols, John. 2012. National Marine Fisheries Service – Chesapeake Bay Field Office. Personal Communication with Kaitlin McCormick. Phone Call. 7 February.

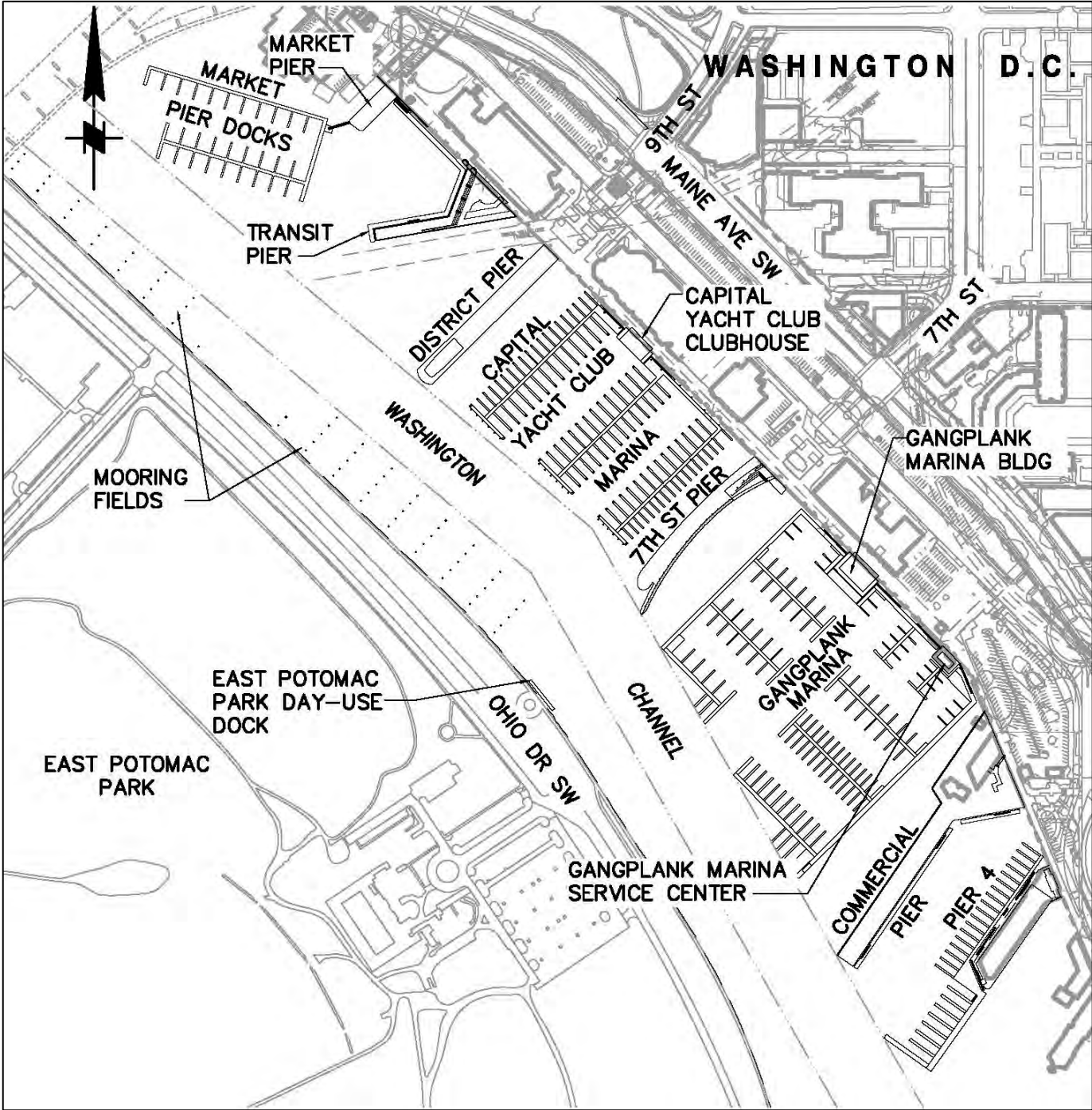
Virginia Institute of Marine Science (VIMS). 2012. *Submerged Aquatic Vegetation in the Chesapeake Bay*. Website: <http://www.vims.edu/bio/sav>. Accessed 9 February.



**Figure 1. Project Location**



Figure 2. Proposed Action



**Figure 3. Waterside Action Plan**

**ATTACHMENT A**  
**PROJECT IMPACT PLATE**

WASHINGTON D.C.

FISH MARKET  
PIER DOCKS

CAPITAL  
YACHT CLUB  
(FLOATING DOCKS  
TO BE REMOVED)

WASHINGTON  
CHANEL

OHIO DR SW

GANGPLANK  
MARINA  
(FLOATING DOCKS TO BE  
REMOVED)

GANGPLANK  
MARINA  
(REMAIN)

EAST POTOMAC  
PARK

REMOVE

ODYSSEY PIER &  
SPIRIT PIER  
(REMAIN)

400' WIDE

PIER 4  
(REMAIN)

POLICE  
PIER

**EXISTING CONDITIONS / DEMOLITION PLAN**

N.T.S.

**SOUTHWEST  
WATERFRONT DEVELOPMENT**

IN: WASHINGTON CHANNEL  
NEAR: EAST POTOMAC PARK  
APPLICATION BY:

HOFFMAN MADISON WATERFRONT  
4725 WISCONSIN AVENUE, NW, SUITE 200  
WASHINGTON, DC 20016

SHEET 2A OF 35

DATE: DECEMBER, 2011



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**ATTACHMENT B**  
**BATHYMETRIC DATA**

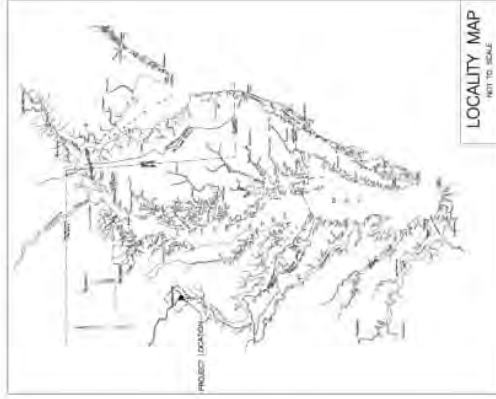


# CONDITION SURVEY ANACOSTIA AND WASHINGTON CHANNELS WASHINGTON, D.C.



## INDEX OF DRAWINGS

TITLE	FILE & MAP NO.	SHEET NO.
COVER SHEET	FILES B-12 MAPS 12-001	1
ANACOSTIA CHANNEL STA. 0+00 TO 8+00	FILES B-23 MAPS 12-002	2
ANACOSTIA CHANNEL STA. 8+00 TO 15+00	FILES B-23 MAPS 12-002	3
ANACOSTIA CHANNEL STA. 15+00 TO 17+25	FILES B-23 MAPS 12-002	4
WASHINGTON CHANNEL STA. 0+00 TO 4+00	FILES B-23 MAPS 12-002	5
WASHINGTON CHANNEL STA. 5+00 TO 7+25	FILES B-23 MAPS 12-002	6



	PROJECT NO. _____	SHEET NO. _____	DATE _____
	DRAWING NO. _____	TITLE _____	SCALE _____



**CONTRACTOR NOTE:**  
 THE BOUNDARIES SHOWN ON THIS PLAN ARE BASED ON THE SURVEY OF THE PROPERTY BY THE ENGINEER AND THE RECORD DEEDS. THE ENGINEER HAS NOT CONDUCTED A FIELD SURVEY OF THE PROPERTY. THE ENGINEER HAS NOT CONDUCTED A FIELD SURVEY OF THE PROPERTY. THE ENGINEER HAS NOT CONDUCTED A FIELD SURVEY OF THE PROPERTY.

NO.	DATE	DESCRIPTION
1	10/15/2024	ISSUED FOR PERMIT
2	10/15/2024	ISSUED FOR PERMIT
3	10/15/2024	ISSUED FOR PERMIT
4	10/15/2024	ISSUED FOR PERMIT
5	10/15/2024	ISSUED FOR PERMIT
6	10/15/2024	ISSUED FOR PERMIT
7	10/15/2024	ISSUED FOR PERMIT
8	10/15/2024	ISSUED FOR PERMIT
9	10/15/2024	ISSUED FOR PERMIT
10	10/15/2024	ISSUED FOR PERMIT

PROJECT NO.	24-0000000000
DATE	10/15/2024
SCALE	AS SHOWN
BY	ALAN L. HARRIS
CHECKED BY	ALAN L. HARRIS
DATE	10/15/2024

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PLAT NO. 106  
 V. 106  
 10/15/2024

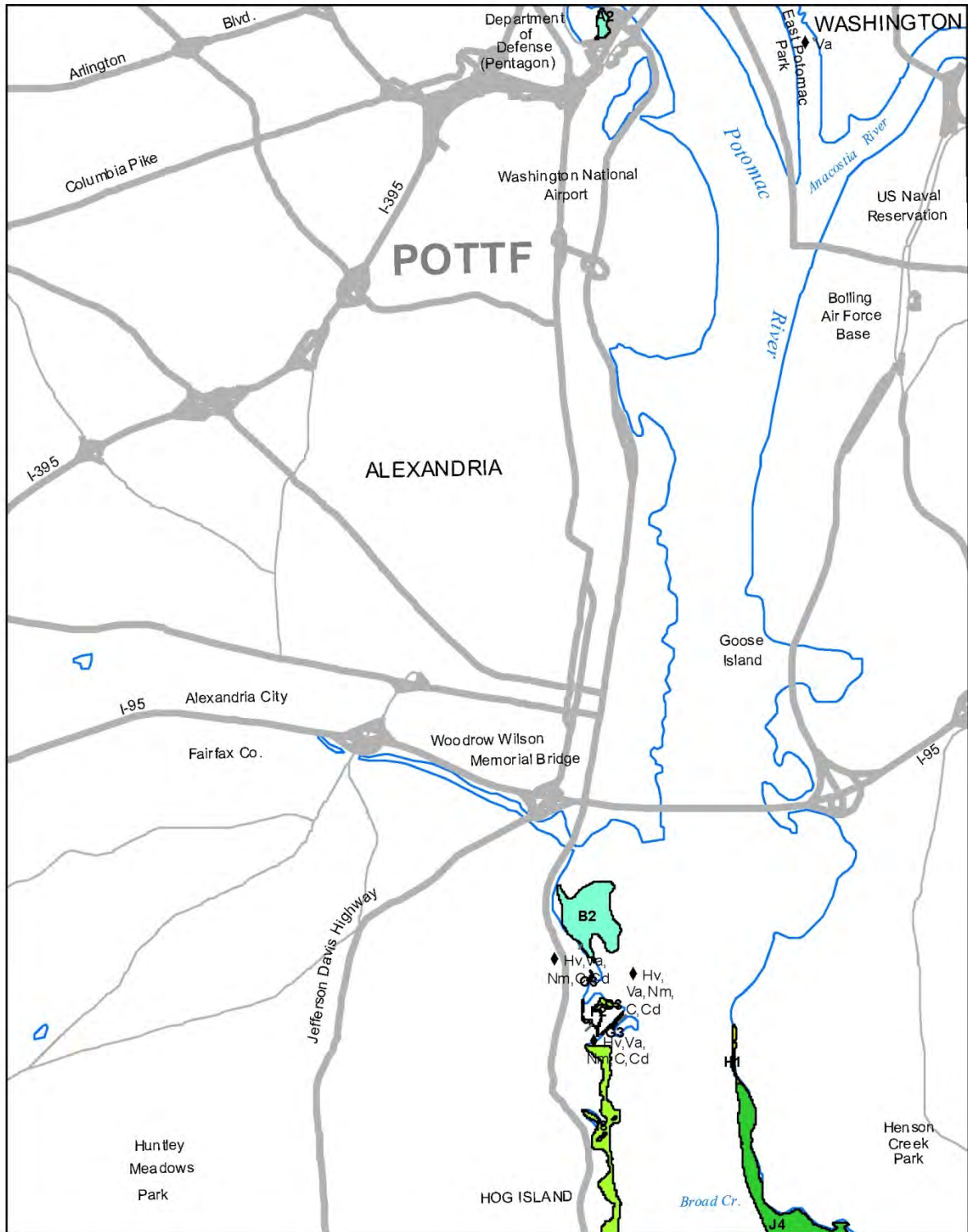


**ATTACHMENT C**

**SAV MAPS**

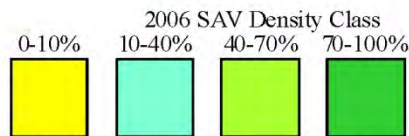
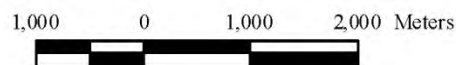
# Submerged Aquatic Vegetation 2006

Alexandria, Va.- D.C.- Md. (34)



**Hectares of SAV: 112.09**

Date Flown: 10/03, 10/31

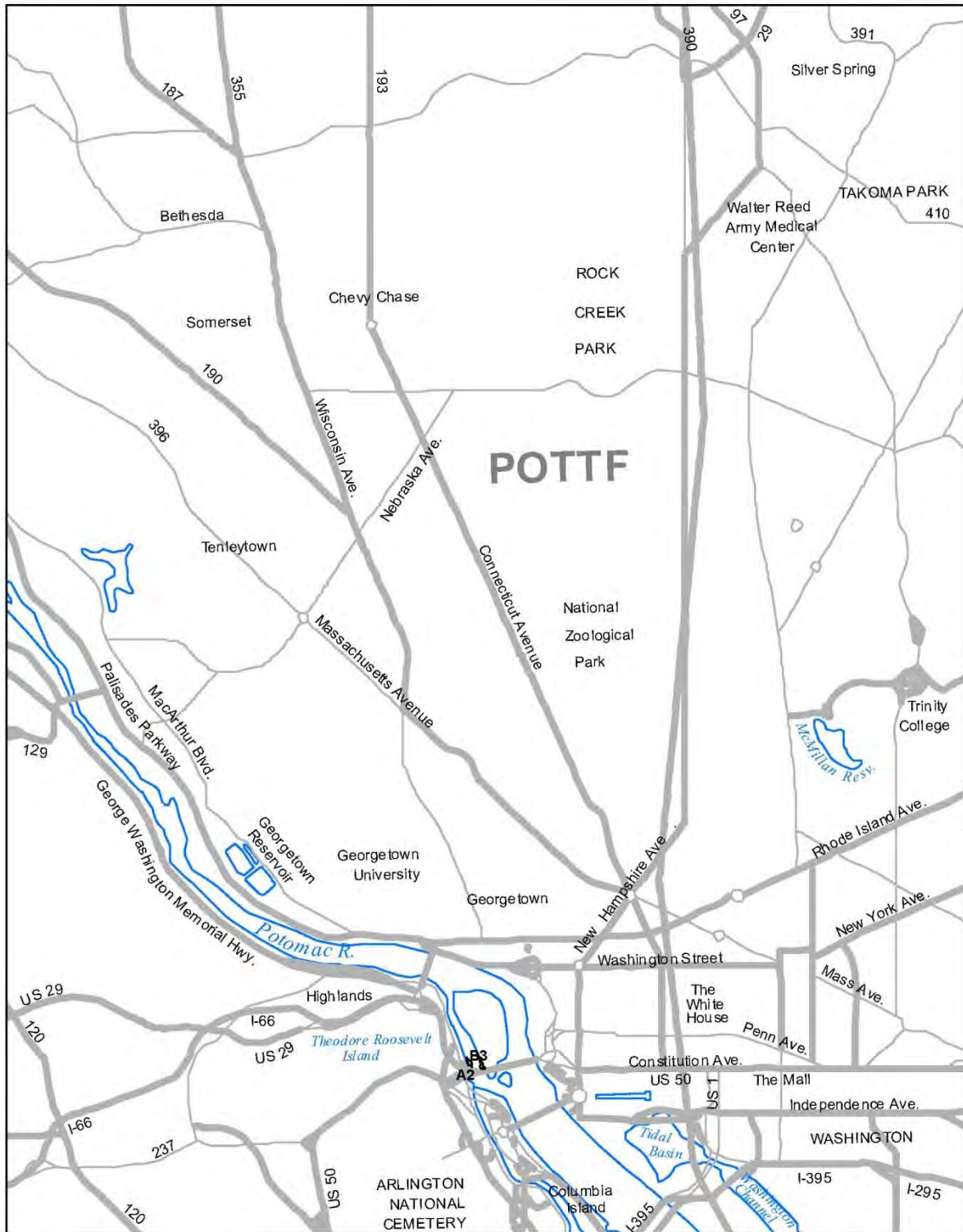


Sources: VIMS, USGS

PDF Created 11/2008

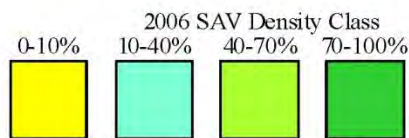
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Washington West, Md.- D.C.- Va (28)



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Date Flown: 10/31

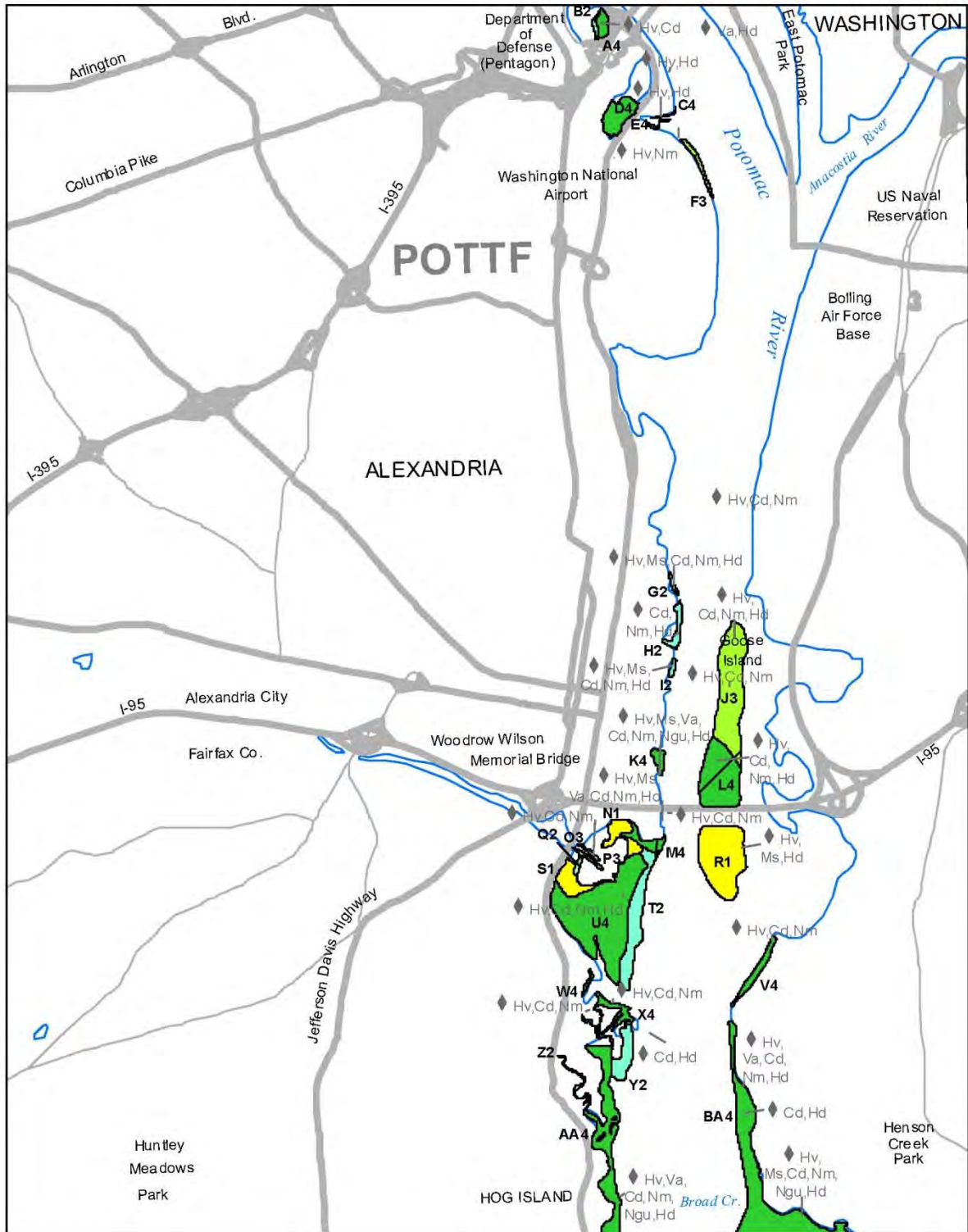


Sources: VIMS, USGS

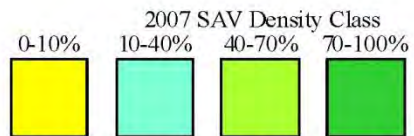
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# Submerged Aquatic Vegetation 2007

Alexandria, Va.- D.C.- Md. (34)



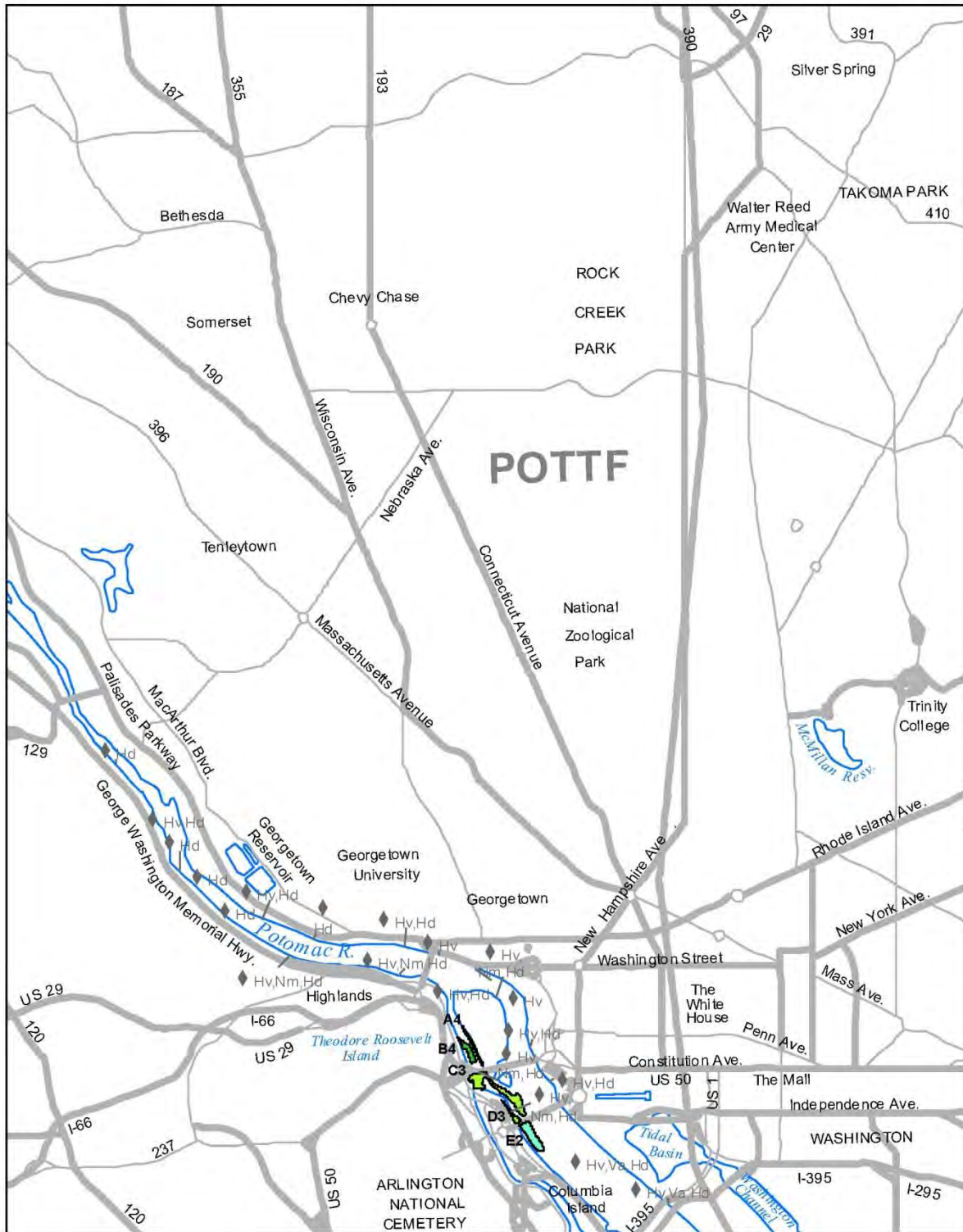
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Sources: VIMS, USGS PDF Created: 12/19/2008

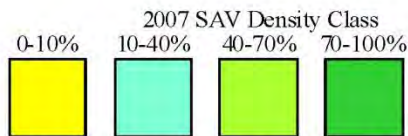
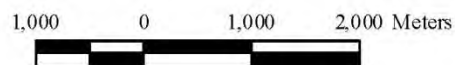
# Submerged Aquatic Vegetation 2007

Washington West, Md.- D.C.- Va (28)



**Hectares of SAV: 12.87**

Date Flown: 09/05, 10/15

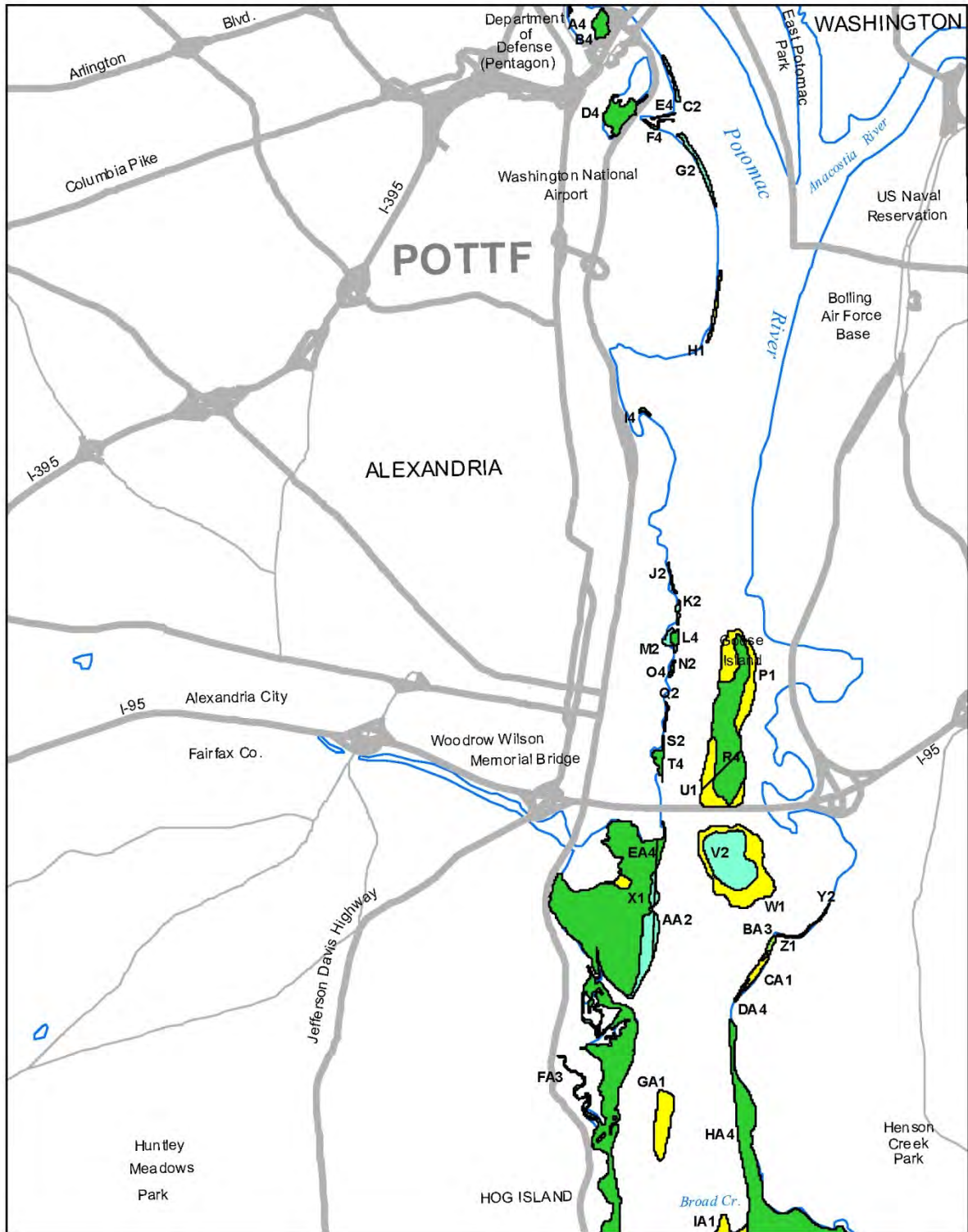


Sources: VIMS, USGS

PDF Created: 11/25/2008

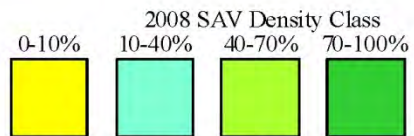
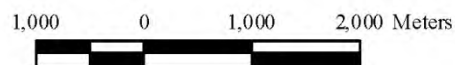
# Submerged Aquatic Vegetation 2008

Alexandria, Va.- D.C.- Md. (34)



**Hectares of SAV: 438.02**

Date Flown: 10/08



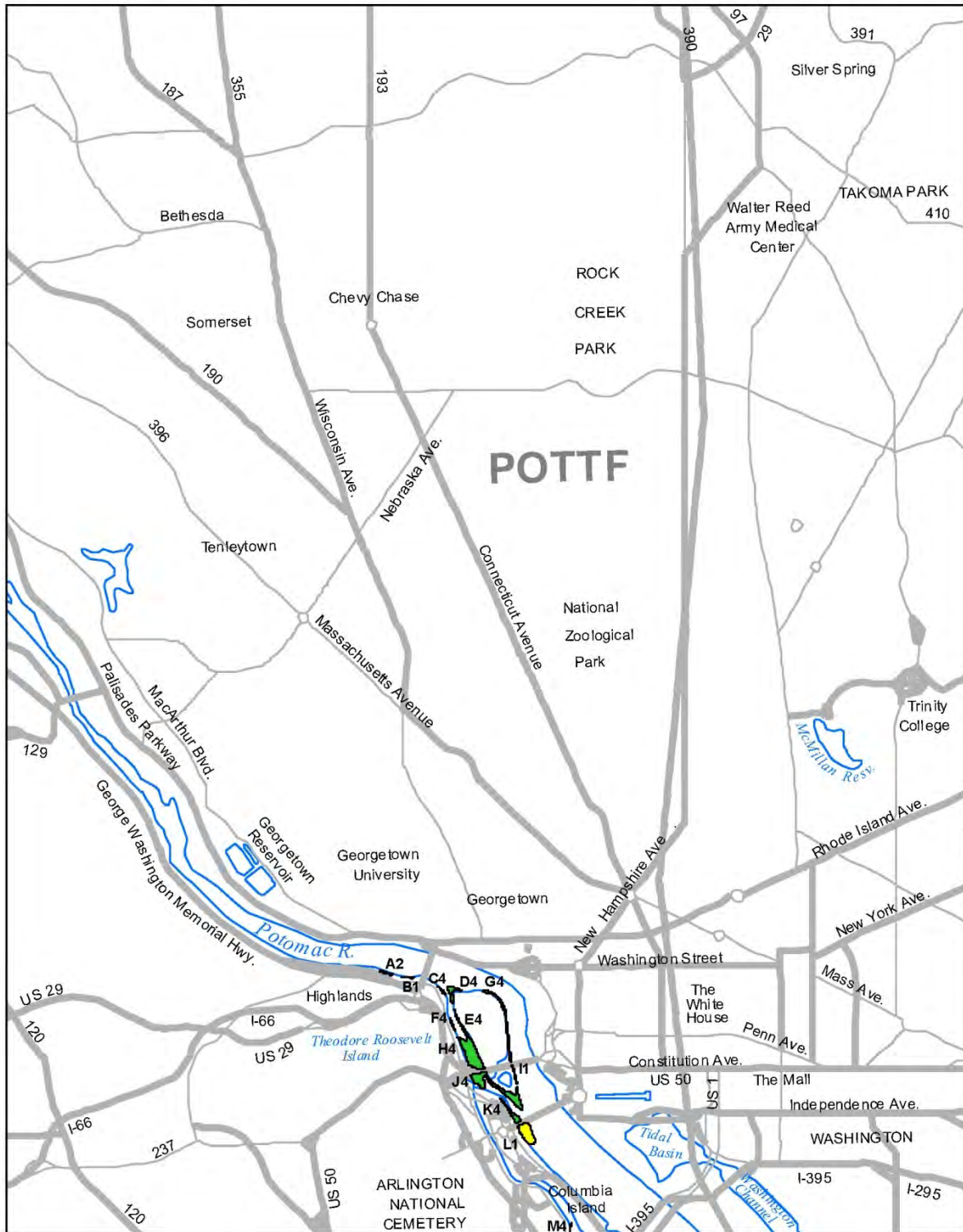
Sources: VIMS, USGS

PDF Created: 10/7/2009



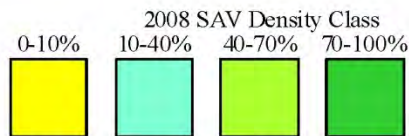
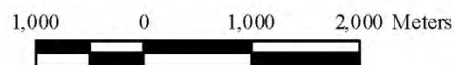
# Submerged Aquatic Vegetation 2008

Washington West, Md.- D.C.- Va (28)



**Hectares of SAV: 16.96**

Date Flown: 10/08

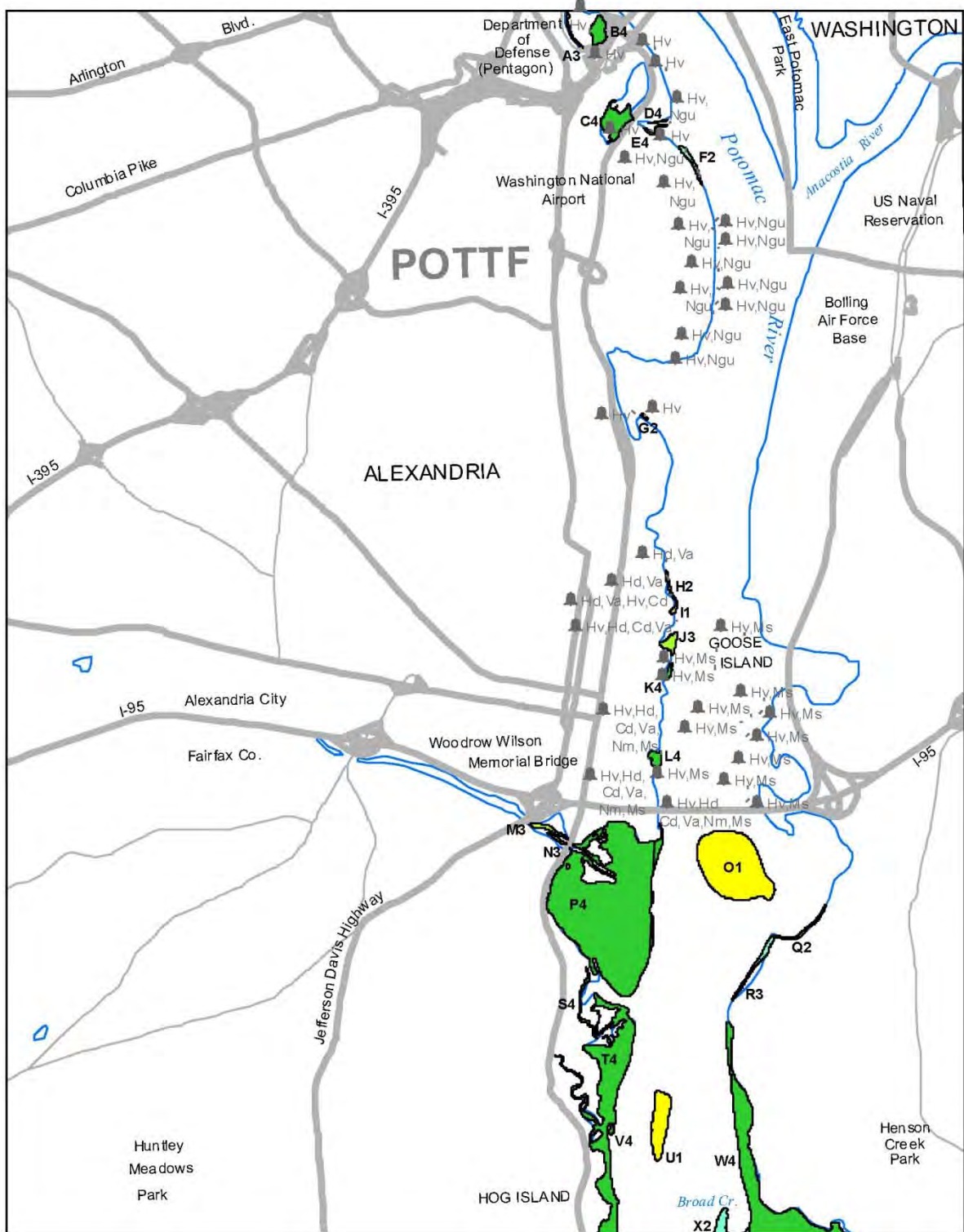


Sources: VIMS, USGS

PDF Created: 10/7/2009

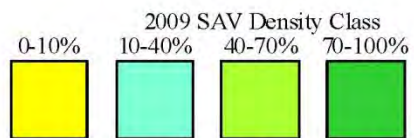
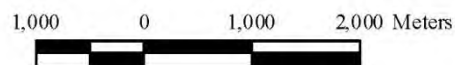
# Submerged Aquatic Vegetation 2009

Alexandria, Va.- D.C.- Md. (34)



**Hectares of SAV: 352.66**

Date Flown: 09/15

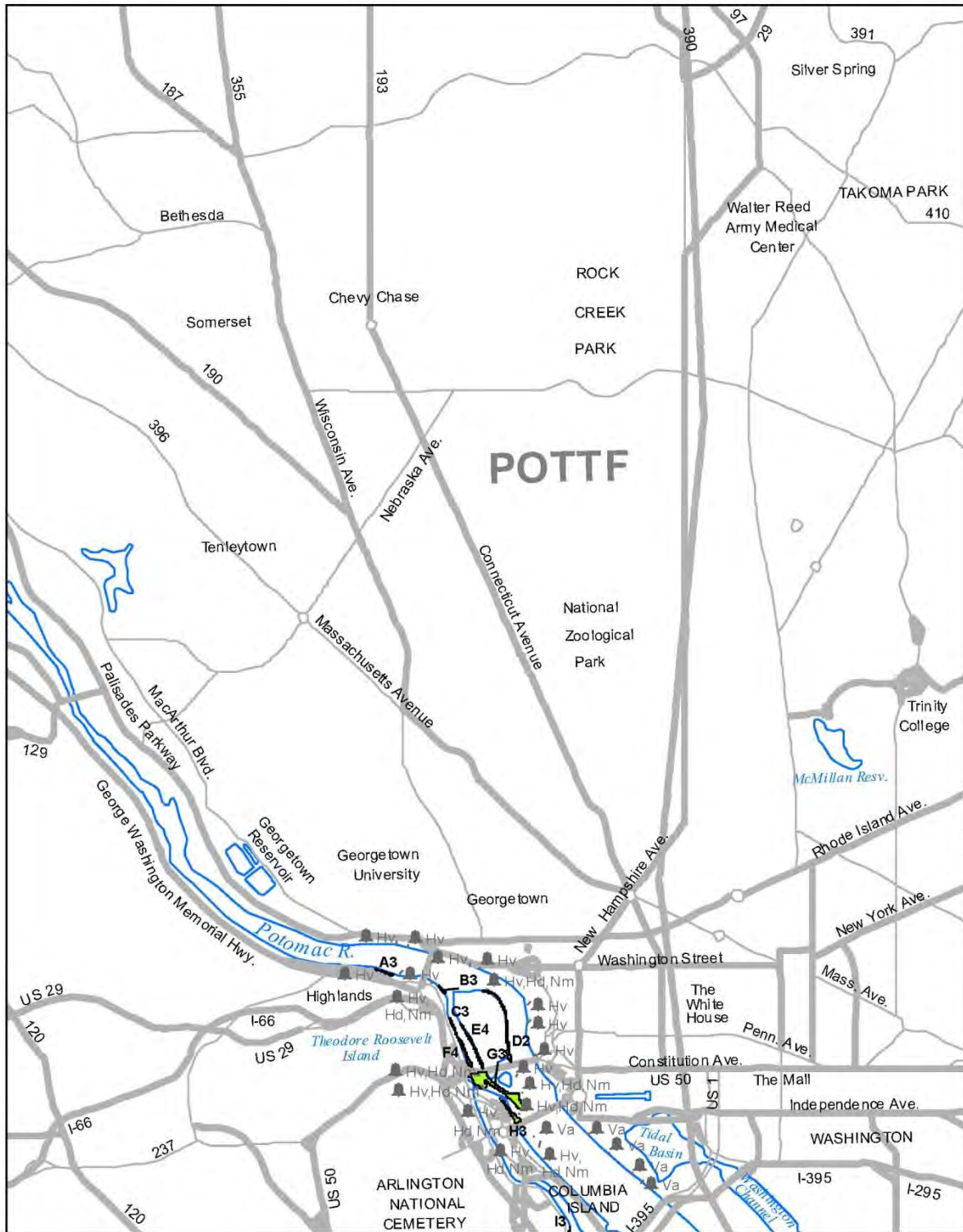


Sources: VIMS, USGS

PDF Created: 10/14/2010

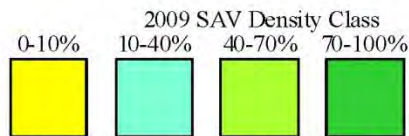
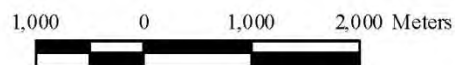
# Submerged Aquatic Vegetation 2009

Washington West, Md.- D.C.- Va (28)



**Hectares of SAV: 9.72**

Date Flown: 09/15

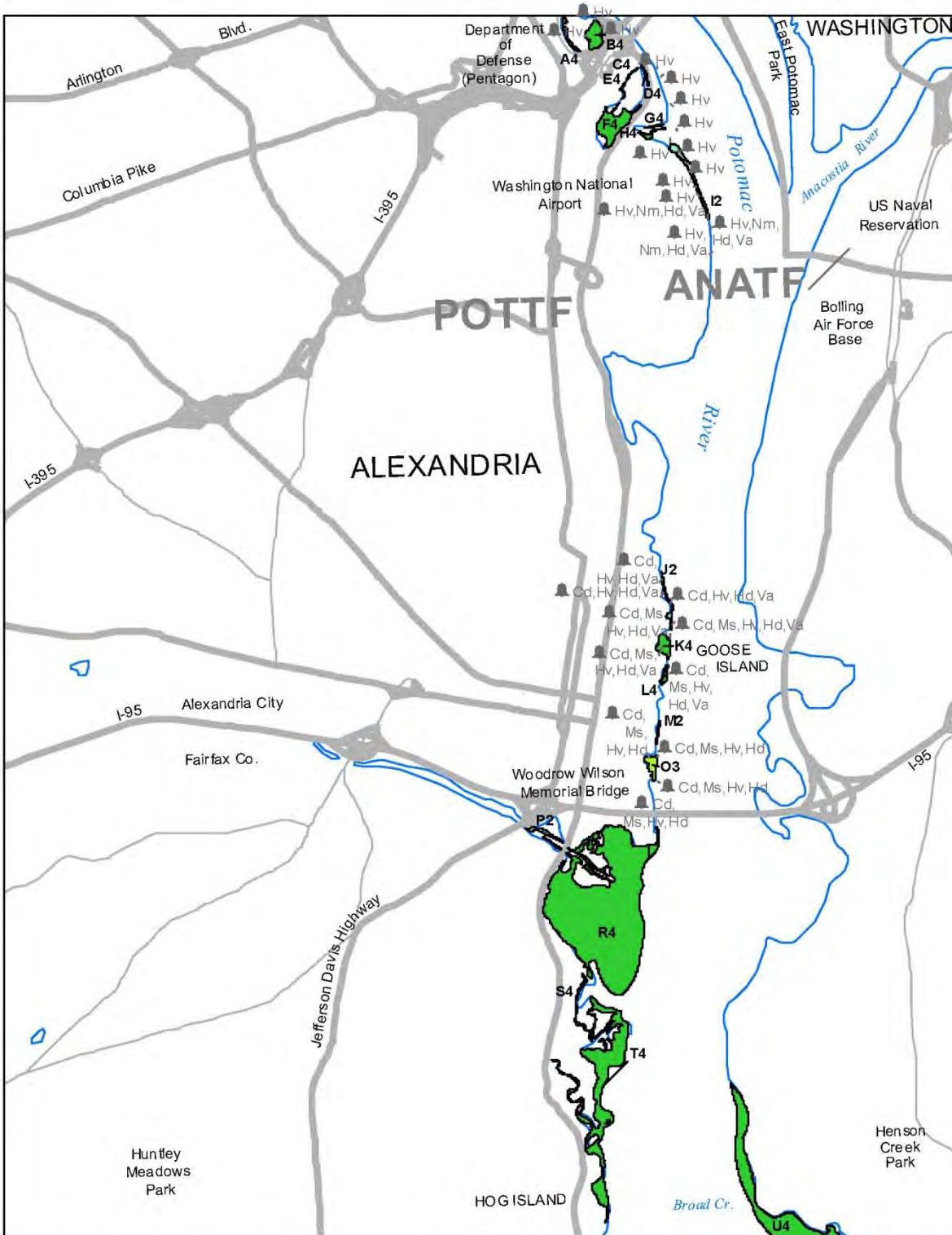


Sources: VIMS, USGS

PDF Created: 10/14/2010

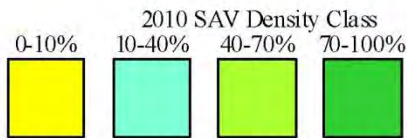
# Submerged Aquatic Vegetation 2010

Alexandria, Va.- D.C.- Md. (34)



**Hectares of SAV: 233.89**

Date Flown: 09/01

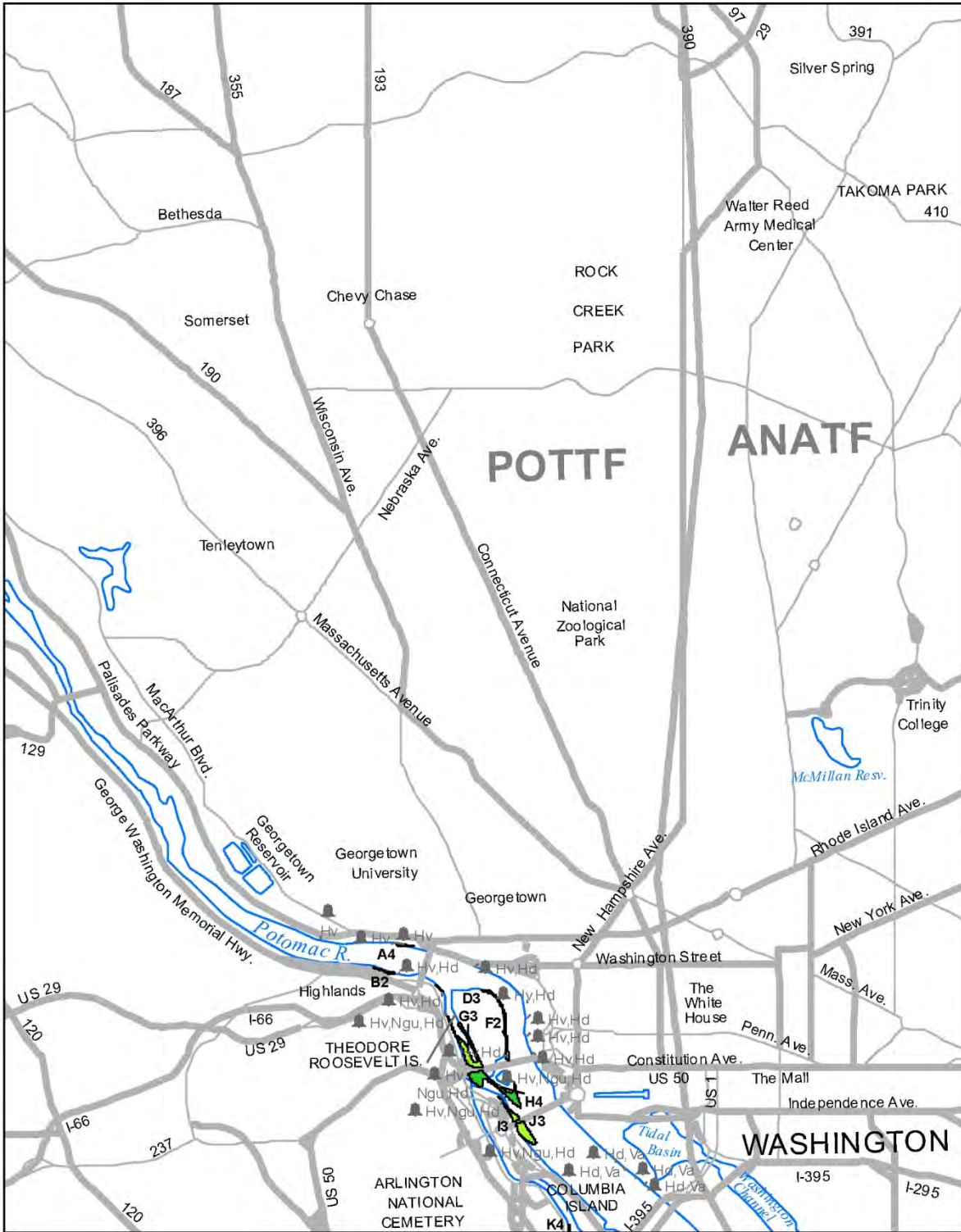


Sources: VIMS, USGS

PDF Created: 10/20/2011

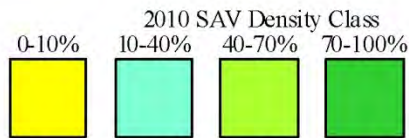
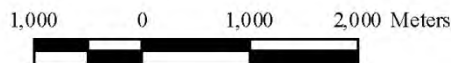
# Submerged Aquatic Vegetation 2010

Washington West, Md.- D.C.- Va (28)



**Hectares of SAV: 14.59**

Date Flown: 09/01



Sources: VIMS,USGS

PDF Created: 10/20/2011