



**Andrew T. Silfer**

Leader, Pittsfield/Housatonic River

General Electric Company  
Global Operations – Environment, Health & Safety  
159 Plastics Avenue  
Pittsfield, MA 01201  
T 518-937-7257 and 413-553-6602  
andrew.silfer@ge.com

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Mr. Dean Tagliaferro  
EPA Project Coordinator  
U.S. Environmental Protection Agency  
c/o Avatar Environmental  
10 Lyman Street, Suite 2  
Pittsfield, MA 01201

**Re: GE-Pittsfield/Housatonic River Site  
Rest of River (GECD850)  
Floodplain Pre-Design Investigation Work Plan – Reach 5A**

Dear Mr. Tagliaferro:

In accordance with Section II.H.3 of the Modified RCRA Permit issued by the U.S. Environmental Protection Agency (EPA) to the General Electric Company (GE) on October 24, 2016, EPA's Revised Notice of Uncontested and Severable Permit Conditions dated January 9, 2017, and GE's *Rest of River Initial Statement of Work* submitted on May 12, 2017, and conditionally approved by EPA on July 10, 2017, enclosed is GE's *Floodplain Pre-Design Investigation Work Plan – Reach 5A*. This plan addresses the requirements of Sections II.B.3.a.(2)(a) and II.B.3.b.(2)(a) of the Modified Permit with respect to Reach 5A of the Rest of River floodplain. It describes GE's proposed pre-design soil sampling program for the Exposure Areas within that reach of the floodplain, as well as associated survey activities and GE's proposed activities to identify potential vernal pools in the Reach 5A floodplain.

Please let me know if you have any questions or would like to discuss this Floodplain Pre-Design Investigation Work Plan for Reach 5A.

Very truly yours,

Andrew T. Silfer  
GE Project Coordinator

Enclosure

cc:

Tim Conway, EPA (electronic copy)  
Christopher Ferry, ASRC Primus (electronic copy)  
Scott Campbell, Avatar (2 hard copies and electronic copy)  
Michael Gorski, MassDEP (electronic copy)  
Mark Tisa, MassDFG (electronic copy)  
Traci Iott, CT DEEP (1 hard copy and electronic copy)  
Susan Peterson, CT DEEP (electronic copy)  
Rod McLaren, GE (electronic copy)  
Kevin Mooney, GE (electronic copy)  
Michael Werth, Anchor QEA (electronic copy)  
Dennis Lowry, AECOM (electronic copy)  
James Bieke, Sidley Austin (1 hard copy and electronic copy)  
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October 2017  
Housatonic River – Rest of River



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# Floodplain Pre-Design Investigation Work Plan Reach 5A

Prepared for General Electric Company

October 2017  
Housatonic River – Rest of River

# Floodplain Pre-Design Investigation Work Plan Reach 5A

**Prepared for**  
General Electric Company

**Prepared by**  
Anchor QEA, LLC  
AECOM



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Appendix A	NHESP Vernal Pool Field Observation Form
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## ABBREVIATIONS

CD	Consent Decree
CMSP	<i>Housatonic River – Rest of River, Corrective Measures Study Proposal</i>
DGPS	Differential Global Positioning System
DMS	data management system
DQO	Data Quality Objective
EA	Exposure Area
EAB	Environmental Appeals Board
EDD	electronic data deliverable
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
Rest of River FSP/QAPP	<i>Rest of River Field Sampling Plan/Quality Assurance Project Plan</i>
GE	General Electric Company
GIS	Geographic Information System
HHRA	<i>Human Health Risk Assessment</i>
Initial SOW	<i>Rest of River Initial Statement of Work</i>
kg	kilogram
MassDFW	Massachusetts Division of Fisheries and Wildlife
mg	milligrams
NHESP	Natural Heritage and Endangered Species Program
PCB	polychlorinated biphenyl
PDI	Pre-Design Investigation
RCMS	<i>Housatonic River – Rest of River, Revised Corrective Measures Study Report</i>
RCRA	Resource Conservation and Recovery Act
QA	quality assurance
QC	quality control
SI	Supplemental Investigation
SOW	Statement of Work
UCL	Upper Confidence Limit
Woodlot	Woodlot Alternatives, Inc.
WPA	Massachusetts Wetlands Protection Act
WWTP	Wastewater Treatment Plant

# 1 Introduction

## 1.1 General

Under the Consent Decree (CD) for the GE Pittsfield/Housatonic River Site (EPA/GE 2000), the Rest of River is defined as that portion of the Housatonic River and its backwaters and floodplain (excluding Actual/Potential Lawns as defined in the CD) located downstream of the confluence of the East and West Branches of the Housatonic River (the Confluence) in Pittsfield, Massachusetts. The CD was executed in 1999 by the General Electric Company (GE), the United States, the States of Massachusetts and Connecticut, and other governmental entities and was approved by the federal district court in 2000. It provided Performance Standards and other requirements relating to the cleanup of GE's facility in Pittsfield, the portion of the Housatonic River between GE's facility and the Confluence, and other adjacent and nearby areas.

For the Rest of River, the CD established a process for the investigation and evaluation of that area and, ultimately, for the U.S. Environmental Protection Agency (EPA) to select a Remedial Action as a modification to a pre-existing Corrective Action Permit under the Resource Conservation and Recovery Act (RCRA), subject to appeal to the EPA Environmental Appeals Board (EAB) and the U.S. Court of Appeals for the First Circuit. EPA issued that permit modification (referred to herein as the Modified Permit), setting forth the selected Remedial Action for the Rest of River, on October 24, 2016 (EPA 2016). GE and several other parties filed petitions for review of the Modified Permit in the EAB.

Paragraph 22.x of the CD required GE to submit a Statement of Work (SOW) for the implementation of the corrective measures that comprise the Rest of River Remedial Action specified in the Modified Permit. However, most of the provisions of the Modified Permit have been stayed due to the appeals to the EAB, either as contested by those appeals or as non-severable from contested provisions. On January 9, 2017, EPA sent a letter to GE identifying the contested and non-severable conditions that are stayed and the uncontested and severable conditions that are not stayed, which became enforceable conditions of the Modified Permit on January 12, 2017 (EPA 2017a). A description of those components that are uncontested and severable and a schedule for submission of work plans or other documents relating to the performance of those components was provided in the *Rest of River Initial Statement of Work* (Initial SOW; Anchor QEA 2017), which was submitted to EPA on May 12, 2017, and conditionally approved by EPA in a letter dated July 10, 2017 (EPA 2017b). As required by Section II.H.3 of the Modified Permit and provided in the Initial SOW, a Floodplain Pre-Design Investigation (PDI) Work Plan, which is one of those uncontested and severable components, is due within 3 months after EPA approval of the Initial SOW. This document constitutes that plan.



This Floodplain PDI Work Plan is submitted, pursuant to Section II.H.3 of the Modified Permit and Section 3.4.1 of the Initial SOW, to address the requirements in Section II.B.3.a.(2)(a) of the Modified Permit. That section of the Modified Permit provides that “the Permittee shall conduct additional sampling of Floodplain soil (as needed) to determine the total PCB exposure point concentration (EPC) for each Exposure Area using a Thiessen polygon approach.” Condition 5.c of EPA’s conditional approval letter for the Initial SOW directed GE to limit its initial Floodplain PDI Work Plan to the uppermost reach of the Rest of River—Reach 5A (defined in Section 1.2). Consistent with Section 3.4.1 of the Initial SOW and that condition, this Floodplain PDI Work Plan: (1) describes the objectives of the floodplain PDI; (2) provides a summary of the previous approach and methods used in the *Housatonic River – Rest of River, Revised Corrective Measures Study Report* (RCMS; Arcadis et al. 2010) to calculate EPCs for polychlorinated biphenyls (PCBs) in the floodplain; (3) summarizes the existing floodplain soil PCB data in the Reach 5A floodplain; (4) describes the approach used to determine the need for and extent of additional PDI floodplain soil sampling; (5) provides an evaluation of supplemental data needs and a proposal, as appropriate, for PDI sampling for PCBs in each Exposure Area (EA) within the Reach 5A floodplain;<sup>1</sup> and (6) describes the survey activities to be conducted in the Reach 5A floodplain, including delineation of potential vernal pools to support the floodplain PDI. The floodplain soil PCB sampling described herein will be implemented in accordance with the sampling and analytical procedures set forth in the *Rest of River Field Sampling Plan/Quality Assurance Project Plan* (Rest of River FSP/QAPP; in development). Separate Floodplain PDI Work Plans will be submitted in the future to cover the remaining reaches of the floodplain that are subject to investigation under the Modified Permit.

## 1.2 Rest of River Setting

### 1.2.1 Rest of River

The Rest of River area consists of the portion of the Housatonic River and its backwaters and floodplain (excluding certain residential properties) downstream of the Confluence (located approximately 2 miles downstream from the GE facility in Pittsfield, Massachusetts). The Rest of River area is shown on Figure 1-1 and identified according to river reach designations established by EPA. The reaches are shown on Figure 1-1, and subreaches established by EPA within Reaches 5 through 8

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<sup>1</sup> EPA identified 90 direct contact EAs in its *Human Health Risk Assessment* (HHRA; EPA 2005). As described in Section 4.3.5 of the HHRA, EAs were defined by EPA starting with individual tax parcels. The parcels were kept intact, subdivided, or combined with adjacent parcels based on similarity of land use, similarity of ownership, and/or number of available soil samples. Of these 90 EAs, 38 are located in Reach 5A. In many cases, parcel boundaries extend beyond the lateral boundaries of the Rest of River (defined in the CD as the 1 milligram per kilogram PCB isopleth in Reaches 5 and 6, which is approximated by the 10-year floodplain, and as the extent of PCBs in Reaches 7 through 9); however, the EAs evaluated for potential soil remediation are limited to the portion of the floodplain between the edge of the Housatonic River and the Rest of River floodplain boundary.

are shown on Figure 1-2. The Rest of River reaches and subreaches are as follows (listed from upstream to downstream):

- Reach 5, from the Confluence downstream to Woods Pond (the first significant impoundment). This reach is further divided into the following subreaches:
  - Reach 5A (from the Confluence to the Pittsfield Wastewater Treatment Plant [WWTP])
  - Reach 5B (from the Pittsfield WWTP to Roaring Brook)
  - Reach 5C (from Roaring Brook to the start of Woods Pond)
  - Reach 5 also contains several backwater areas adjacent to the Housatonic River, particularly in the more downstream portion of the reach (these backwaters are sometimes referred to as Reach 5D)
- Reach 6, Woods Pond
- Reach 7, Woods Pond Dam to Rising Pond (the next significant impoundment). This reach is further divided into the following subreaches:
  - Reach 7A, Woods Pond Dam to Columbia Mill Dam Impoundment
  - Reach 7B, Columbia Mill Dam Impoundment
  - Reach 7C, Former Eagle Mill Dam Impoundment
  - Reach 7D, Former Eagle Mill Dam to Willow Mill Dam Impoundment
  - Reach 7E, Willow Mill Dam Impoundment
  - Reach 7F, Willow Mill Dam to Glendale Dam Impoundment
  - Reach 7G, Glendale Dam Impoundment
  - Reach 7H, Glendale Dam to Rising Pond
- Reach 8, Rising Pond
- Reach 9, Rising Pond Dam to the Massachusetts/Connecticut border
- Reach 10, Massachusetts/Connecticut border to Falls Village Dam
- Reach 11, Falls Village Dam to Cornwall Bridge
- Reach 12, Cornwall Bridge to Bulls Bridge Dam
- Reach 13, Bulls Bridge Dam to Bleachery Dam
- Reach 14, Bleachery Dam to Shepaug Dam (Lake Lillinonah)
- Reach 15, Shepaug Dam to Stevenson Dam (Lake Zoar)
- Reach 16, Stevenson Dam to Lake Housatonic Dam (Lake Housatonic)

### 1.2.2 Reach 5A Floodplain

Within Reaches 5 and 6 (i.e., between the Confluence and Woods Pond Dam), the CD defines the Rest of River site boundary as the floodplain area extending laterally to the 1 milligram per kilogram (mg/kg) PCB isopleth, which corresponds approximately to the 10-year floodplain. As noted in Section 1.1, the scope of this Floodplain PDI Work Plan has been limited to the floodplain in Reach 5A (Figure 1-3). The floodplain in Reach 5A covers approximately 325 acres and ranges in width from 100 feet at its narrowest point to approximately 2,500 feet at its widest point (BBL and QEA 2003). The relatively wide floodplain in most of Reach 5A is a result of the gentle slope of the local topography (which is illustrated by relatively few elevation contours within the 1 mg/kg PCB isopleth on Figure 1-3, particularly in the widest floodplain area in the northern portion of Reach 5A). Vegetation in the floodplain varies from short grasses to mature trees. Characterization of the Housatonic River floodplain between the Confluence and Woods Pond Dam, performed by Woodlot Alternatives, Inc. (Woodlot), on behalf of EPA (Woodlot 2002), resulted in the identification of 18 vegetation community types within this reach. Palustrine communities cover a majority of the floodplain (approximately 67%), while riverine, terrestrial, and lacustrine communities cover approximately 21%, 10%, and 2% of the floodplain, respectively (BBL and QEA 2003). Reach 5A also contains numerous potential vernal pools that were delineated previously (shown on Figure 1-3) as part of an overall effort to map vernal pools from Newell Street to Woods Pond using methods developed by Kenney (1995) (TechLaw 1998, as referenced in Appendix A.18 to EPA's *Supplemental Investigation Work Plan for the Lower Housatonic River* [EPA 2000]). Pursuant to Section II.B.3.b.(2)(a) of the Modified Permit, a survey to identify potential vernal pools in Reach 5A of the Rest of River floodplain will be conducted as part of this PDI.

## 1.3 Work Plan Organization

The remainder of this Floodplain PDI Work Plan is organized into the following five sections:

- Section 2 presents a summary of the applicable requirements for floodplain soil investigations, as set forth in the Modified Permit.
- Section 3 provides a summary and assessment of the existing floodplain soil PCB data for Reach 5A and a discussion of the method of calculation of floodplain EPCs for EAs, where appropriate, based on the soil PCB sampling data combined with certain other spatial features, such as human accessibility mapping established by EPA in its *Human Health Risk Assessment* (HHRA; EPA 2005).
- Section 4 contains a summary of Data Quality Objectives (DQOs) for the floodplain PDI, a description of the approach used to identify proposed additional floodplain soil sample locations to meet those DQOs, an identification of the proposed sample locations in the EAs in the Reach 5A floodplain, a brief summary of the sampling and analysis procedures, and a

description of proposed survey activities, including those to be conducted to identify potential vernal pools in the Reach 5A floodplain.

- Section 5 provides a description of field documentation and data management procedures.
- Section 6 provides a schedule for performance of floodplain soil sample collection and survey activities in Reach 5A and a description of how the floodplain PDI data collection activities and analytical results for that reach will be reported.

## 2 Summary of Applicable Requirements

Section II.B.3 of the Modified Permit sets forth the Performance Standards for Rest of River floodplain and vernal pools. Most of Section II.B.3 has been stayed due to the appeals to the EAB, but Sections II.B.3.a.(2)(a) and II.B.3.b.(2)(a) are in effect.

Section II.B.3.a.(2)(a) states that GE shall conduct additional sampling of floodplain soil (as needed) to determine the total PCB EPC for each EA using a Thiessen polygon approach. Footnote 12 of the Modified Permit further states that “EPCs shall be calculated using the methods described in Appendix D to the GE’s Corrective Measures Proposal and subsequent revisions described in Section 4.4 in GE’s October 2010 Revised Corrective Measures Study, including the use of an approved 95th Upper Confidence Limit method to estimate the mean concentration of total PCBs, the use of spatially interpolated representation of floodplain soil PCB data, and factoring in habitat community mapping where applicable.” These methods are summarized in Section 3.2.

Section II.B.3.b.(2)(a) states that GE shall submit a plan to identify potential vernal pools. That plan is provided in Section 4.3.1 of this document. In summary, this section provides a description of the criteria that will be applied in this PDI to define vernal pools and a description of the field survey activities that will be completed to identify potential vernal pools in Reach 5A based upon the above criteria. As noted in the Modified Permit, EPA will make the final determination as to what constitutes a vernal pool; areas determined not to be vernal pools will be considered backwaters or floodplain soil depending on whether the area is typically inundated.

We also note that the Modified Permit specifies numerical Performance Standards (i.e., soil PCB concentrations) for the floodplain EAs (summarized in Tables 1 and 2 of the Modified Permit) and for vernal pools (specified in Section II.B.3.b.(1)(a) of the Modified Permit). These Performance Standards have been challenged in the EAB and thus are stayed. As described in Section 4.2.1, the approach used to evaluate the need for and extent of PDI floodplain sampling is a weight-of-evidence approach that has considered various factors. As discussed in that section, one of those factors, utilized in some cases, is a general comparison of the EPC for an EA calculated based on existing soil PCB data (presented previously in the RCMS) to the Performance Standard specified for that EA in the Modified Permit. The comparison of those EPCs to the Performance Standards in the Modified Permit has been used herein, where appropriate, under the assumption that those Performance Standards are conservative and will not become more stringent; it should not be considered as accepting the validity of those Performance Standards.



## 3 Assessment of Existing Reach 5A Floodplain Soil PCB Data

### 3.1 Data Summary

A number of studies dating back to the late 1980s were conducted to characterize floodplain soil PCB concentrations. Between 1988 and 1998, GE collected over 1,000 floodplain soil samples along the Massachusetts portion of the Rest of River, nearly 500 of which were located in Reach 5A. The most recent comprehensive sampling of the Rest of River floodplain was conducted by EPA as part of its Supplemental Investigation (SI) between 1998 and 2002. EPA collected nearly 5,000 floodplain soil samples (including in vernal pools) during the SI; approximately 1,400 of these samples were collected in Reach 5A. Following the SI, GE collected approximately 100 soil samples in 2005 to further characterize the extent of PCBs in certain portions of the Rest of River floodplain, including approximately 40 in Reach 5A.

The above-described soil data collected within the Rest of River floodplain formed the basis for the floodplain evaluations performed for the RCMS in 2010. The use of these data (which was previously approved by EPA), including the earlier “historical” floodplain soil samples, was deemed appropriate for the RCMS evaluations because floodplain soils are not as dynamic a medium as surface water or sediment and are thus not expected to have significant changes in PCB concentrations over time.

In addition to these data, GE collected nearly 1,700 floodplain soil PCB samples (approximately 700 in Reach 5A) between 2013 and 2015 in a pre-design investigation for the Removal Action Area known as the Housatonic River Floodplain Current Residential Properties Downstream of Confluence – Actual/Potential Lawns (hereafter referred to as “Downstream Floodplain Residential Properties”). Many of these Downstream Floodplain Residential Properties are located adjacent to Rest of River EAs; and in some cases, the samples collected under that program have Thiessen polygons extending into the Rest of River EAs, such that the data from those properties can be used to supplement the interpolation of soil PCB concentrations within the EAs (as described in Section 3.2) near the boundaries with these residential properties.

In summary, the historical floodplain soil data set considered in the RCMS, supplemented by additional data collected since then as part of the Downstream Floodplain Residential Properties sampling, have been considered in the evaluation of supplemental data needs and selection of PDI sampling locations in this Floodplain PDI Work Plan. Those data, as further supplemented by the data to be collected as part of the floodplain PDI described herein, will be used during the Rest of River remedial design to delineate floodplain remediation areas based on comparison of the EPCs to the applicable Performance Standards.

### 3.2 Floodplain Exposure Point Concentrations Based on Existing PCB Data

EPA's HHRA divided the Rest of River floodplain into 90 EAs for the assessment of direct human contact with floodplain soils. Specific exposure scenarios and receptors were then assigned to each EA. Several of the EAs contain overlying direct contact subareas, which are typically characterized by a different and/or more frequent exposure scenario.<sup>2</sup> In addition, in the RCMS, GE identified "heavily used subareas" within EAs that were identified as "frequently used" in the *Housatonic River – Rest of River, Corrective Measures Study Proposal* (CMSP; Arcadis BBL and QEA 2007). These heavily used subareas are referred to as "Frequently Used Subareas" in the Modified Permit and will be referred to as such in this Floodplain PDI Work Plan. The 38 EAs and 3 Frequently Used Subareas located within Reach 5A are shown on Figure 3-1. As noted in Section II.B.3.(a)(1) of the Modified Permit, EPCs for the EAs are to be calculated for the top 1 foot of soil, while those for the Frequently Used Subareas are to be calculated for the top 3 feet of soil.

Consistent with Footnote 12 of the Modified Permit, EPCs were (and will continue to be) calculated using the methods described in Appendix D to GE's CMSP and subsequent revisions described in Section 4.4 of the RCMS. As described in the CMSP, calculation of the EPCs requires incorporation of several spatially varying features within the floodplain. To facilitate these calculations, a Geographic Information System (GIS)-based application was developed that employs a raster data model, whereby floodplain features, such as locations of EAs and soil PCB concentration data (among others described below), are translated to 3×3-meter grid cells over the floodplain.

The spatial interpolation method using Thiessen polygons was utilized to generate a continuous PCB data coverage over the floodplain. Consistent with the method used by EPA in the HHRA, generation of Thiessen polygons in the floodplain for Reaches 5 and 6 considered topographic and hydrologic information in the interpolation process. Because PCBs are typically transported onto the floodplain during overbank flow conditions, the PCB distribution in floodplain soils is linked to the topographic and hydrologic features that also influence the distribution of wetland habitats. In Reaches 5 and 6, 6 "super habitats" (i.e., grouped habitats having similar characteristics, developed from the Woodlot [2002] habitat survey) were introduced by EPA in the HHRA to guide the spatial interpolation of PCBs in the floodplain. Figure 3-2 shows the EAs and super habitats within Reach 5A. To generate the spatially interpolated PCB data coverage over the entire floodplain, Thiessen polygons were first generated for each individual super habitat using only the data from within that super habitat boundary. The Thiessen polygons generated for all 6 super habitats were then merged to form a

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<sup>2</sup> As described in the HHRA, several EAs were divided into subareas based on the observation that distinct activities could occur at different locations within the EA. In these cases, a risk assessment was conducted for the activity in the subarea in addition to the activity in the EA as a whole.

single PCB polygon raster coverage for the entire floodplain within Reaches 5 and 6. Figures provided in Section 4.2.2 of this Floodplain PDI Work Plan show 0- to 6-inch and 6- to 12-inch PCB polygons interpolated using this method for the EAs in the Reach 5A floodplain.<sup>3</sup>

The Rest of River floodplain contains numerous samples at the surface (particularly in Reaches 5 and 6); however, sample density decreases with depth. In general, the Housatonic River floodplain soil cores were processed in 6-inch intervals. To account for the variable sample density with depth, PCB polygons were generated in 6-inch intervals, and the 0- to 1-foot and 0- to 3-foot average PCB concentrations for a given EA or Frequently Used Subarea, respectively, were computed by vertically averaging the PCB polygon raster grids from the appropriate depth layers.

Using the interpolated PCB data set, average soil PCB concentrations were then computed for each EA or Frequently Used Subarea as the 95% Upper Confidence Limit (UCL) on the spatially weighted mean of the data for that EA or subarea. Consistent with the method developed by EPA in the HHRA and used by GE in the RCMS, the 95% UCL was calculated using the Modified Halls Bootstrap Method (described in HHRA, Volume I, Attachment 4). Once the UCL was calculated for a given EA or Frequently Used Subarea, it was compared to the maximum data value within that area, and the lower of those two values was used as the EPC (i.e., the EPC is not allowed to exceed the maximum interpolated value within a given area). The method developed by EPA for the 95% UCL calculations also included application of accessibility weighting factors (hereafter referred to as “use factors”) in Reaches 5 and 6. Specifically, the floodplain in those reaches was mapped into four accessibility categories (walkable, wadable, difficult, and boatable) in the HHRA, corresponding to weighting factors of 1.0, 0.2, 0.2, and 0.0 for each of these areas, respectively. The accessibility categories applied to the EAs in Reach 5A are shown on Figure 3-2. Consistent with the methodology applied by EPA in the HHRA (described in HHRA Section 4.4.1.1.1), these use factors were applied as multipliers on the interpolated PCB concentrations “to account for the variation in accessibility and overall attractiveness of these habitats to children and adults engaged in recreational or residential and other activities” (e.g., areas considered walkable would be accessed more frequently than areas considered difficult to access).

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<sup>3</sup> For purposes of this Floodplain PDI Work Plan, it was not necessary to develop polygons and existing EPCs for depth increments down to 3 feet in the Frequently Used Subareas in Reach 5A. However, the existing sampling data at depths down to 3 feet within or near those subareas were considered in assessing the need for and extent of PDI sampling in the 1- to 3-foot depth increment in those subareas.

## 4 Floodplain Pre-Design Investigation Activities

### 4.1 Data Quality Objectives

Section II.B.3.a.(2)(a) of the Modified Permit requires GE to conduct additional sampling of floodplain soil as needed. Specific DQOs for the floodplain PDI soil sampling and analysis activities described herein are:

- DQO 1. Obtain soil PCB data within the Reach 5A floodplain to supplement the existing floodplain soil PCB data set, as appropriate, to provide ample spatial coverage and sample density for calculation of representative 0- to 1-foot PCB EPCs for the EAs in the Reach 5A floodplain and 0- to 3-foot PCB EPCs for the Frequently Used Subareas in that reach;
- DQO 2. Provide a dataset of 0- to 1-foot and 0- to 3-foot EPCs that can be used to demonstrate that the applicable Performance Standards (when finalized) for the Reach 5A floodplain EAs either are currently achieved or will be achieved through the performance of remediation activities to be specified during remedial design; and
- DQO 3. Provide sufficient floodplain soil PCB data and survey information to support future remedial design and remedial action evaluations and work plans for the Reach 5A floodplain. While supplemental data may be needed, the combined data sets should support delineation of the remediation extent to meet applicable Performance Standards, including preliminary access and constructability considerations.

The data collection activities that will be performed to achieve these DQOs are described in Section 4.2 below. As described in Section 4.2.1, the approach used to determine the number, locations, and depths of proposed floodplain PDI sampling in each EA was a judgmental (i.e., non-statistical) approach that considered several factors in each EA.<sup>4</sup> Those factors included the existing PCB sample coverage in different depth intervals, super habitats, use factors, and, in some cases, a comparison of the EPC based on existing data to the currently stayed floodplain Performance Standard for that EA.

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<sup>4</sup> It should be noted that EPA's *Guidance on Systematic Planning Using the Data Quality Objectives Process* (EPA 2006) allows for judgmental sampling design where appropriate, stating (on page 73), "The planning team will need to determine whether to consider only designs that are probability-based or whether certain judgmental designs are acceptable, typically depending on the extent of constraints imposed on the study." Further, Section 4.2 of EPA's *Guidance on Choosing a Sampling Design for Environmental Data Collection* (EPA 2002) states that judgmental sampling is appropriate in several situations, including instances where "there is reliable historical and physical knowledge about the feature or condition under investigation." This is certainly the case here, given the extensive historical PCB sampling and habitat characterization that has occurred in the Rest of River floodplain.

## 4.2 Pre-Design Soil Sampling Activities for PCBs

### 4.2.1 *Approach to Identifying Proposed Sampling Locations*

To evaluate the need for and extent of floodplain PDI sampling to achieve the DQOs described in Section 4.1, a weight-of-evidence evaluation of several factors was conducted for each of the 38 EAs (and the 3 Frequently Used Subareas) located in Reach 5A. A description of each of those factors is provided below.

- Primary considerations in the weight-of-evidence evaluation were the density, spatial coverage, and resulting interpolation of the existing soil PCB data. Specifically, this included the following:
  - An assessment of the existing floodplain soil sample density (i.e., number of samples per acre) and the spatial coverage within the EA (e.g., whether the EA has existing samples that are relatively uniformly distributed or samples that are clustered in relatively small portion[s]) was first conducted. This assessment focused primarily on the 0- to 6-inch and 6- to 12-inch depth intervals.<sup>5</sup> With respect to sampling density, EAs with existing densities less than approximately 4 samples per acre (in either depth interval) were generally identified for additional PDI sampling.<sup>6</sup> The spatial distribution of samples within the EA (horizontally and vertically) was also considered, independent of sample density, to evaluate whether additional PDI sampling would be required to improve coverage in certain portions (or throughout) the EA. For example, some EAs were judged to have an adequate sample density on a samples-per-acre basis, but spatial coverage was relatively poor due to clustering of samples in portions of the EA. Additional PDI samples were, therefore, proposed in the remaining portions of such an EA.
  - An assessment of potential limitations related to the interpolation of existing data was conducted. As described in Section 3.2, the method used to generate a spatially interpolated PCB data coverage over the entire floodplain involved first generating Thiessen polygons for each of 6 super habitats using only the data from within that super habitat boundary. There are some instances where this created expansive polygons that extended into areas that were interpolated from samples located far away and, in certain cases, from samples on the opposite side of the river. To address such issues, additional PDI sample locations were selected to provide adequate coverage within each super habitat type within the EA.

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<sup>5</sup> While the primary focus was on 0- to 6-inch and 6- to 12-inch depth intervals, spatial coverage of floodplain soil samples to a depth of 3 feet was reviewed when evaluating the need for and selecting PDI locations in Frequently Used Subareas.

<sup>6</sup> A sampling density of 4 samples per acre was solely used for the purposes of initially screening the EAs to identify those that had relatively lower sample counts. This was done in recognition of the significant variation in acreage of the EAs in Reach 5A (ranging from 0.04 to 59 acres). However, sampling at this density is not required to calculate a reliable EPC for each EA.



- Secondary considerations in the weight-of-evidence evaluation included the following:
  - The presence or absence of difficult-to-access, wadable, or boatable areas was considered where appropriate. For example, lower sample density is warranted in areas that are considered difficult to access based on EPA’s methodology for EPC calculation in the HHRA (see Section 3.2).
  - A comparison of the EPC in the EA, calculated based on existing data, to the Floodplain Performance Standard specified in the Modified Permit for that EA was also considered in some cases, particularly where the sufficiency of sample density and spatial coverage was judged to be borderline. For example, in an EA with borderline sample density and spatial coverage, fewer (or no) additional samples may be necessary if the EA has an existing EPC that is considerably lower than the Performance Standard.

Section 4.2.2 below provides a detailed assessment of PDI sampling needs in each EA. Each subsection includes a summary of the EA, including a count and list of properties (i.e., tax parcels) or portions of properties within the EA, the exposure scenario(s) evaluated in the HHRA and RCMS for that EA (including any subarea[s] and/or Frequently Used Subareas evaluated in the RCMS), and a summary of existing soil PCB data coverage/density. Next, a description of the proposed PDI locations and sample depths is provided, along with the rationale for that proposal. Specifically, this includes a discussion of the various factors used in determining the need for and extent of PDI sampling, as described above. Figures 4-1 through 4-26 show the following for each EA:

- Super habitats, accessibility, and Core Area 1 habitat,<sup>7</sup> if any (panel A);
- 0- to 6-inch sample locations and PCB polygons interpolated using the method described in Section 3.2 (panel B);
- 6- to 12-inch sample locations and PCB polygons interpolated using the method described in Section 3.2 (panel C); and
- 0- to 12-inch average PCB concentrations based on existing data and the proposed PDI sample locations (panel D).<sup>8</sup>

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<sup>7</sup> As defined in the Modified Permit, Core Area 1 habitat consists of areas identified by the Massachusetts Division of Fisheries and Wildlife (MassDFW) as areas with “the highest quality habitat for species that are most likely to be adversely impacted by PCB remediation activities,” most of which species are plants because they are not mobile (Attachment B to Modified Permit).

<sup>8</sup> As previously noted, polygons and average concentrations are not presented for depth increments below 1 foot. However, for the 3 Frequently Used Subareas in Reach 5A, existing sample locations within and near those subareas with soil PCB samples extending to (or near) a depth of 3 feet were considered in selecting PDI locations that will be sampled to a depth of 3 feet. Panel D shows the locations with existing samples deeper than 12 inches, as well as the proposed PDI samples to a depth of 3 feet within those subareas.

## **4.2.2 Proposed Sampling Locations**

Sections 4.2.2.1 through 4.2.2.34 provide summary information regarding each of the 38 EAs in Reach 5A and describe the proposed PDI sample locations, sample depths, and rationale for the number, location, and depth of the samples proposed in each EA.

### **4.2.2.1 Exposure Area 1**

EA 1 occupies approximately 15 acres and is located near the Confluence. This EA consists of a portion of Pittsfield Tax Parcel H6-4-105 (owned by the Massachusetts Division of Fisheries and Wildlife [MassDFW]), as shown on Figure 4-1 (panel A). EA 1 was classified by EPA as a medium-use area and was evaluated in the HHRA and RCMS using the general recreation exposure scenario for older child and adult receptors (RCMS Table 4-1). A relatively large portion of this EA (approximately 50%) is considered by EPA to be difficult to access, with a small portion considered boatable. There is no Core Area 1 habitat and no Frequently Used Subareas within this EA.

Previous soil PCB sampling in EA 1 resulted in the analysis of 64 samples from the 0- to 6-inch depth interval (approximately 4 samples per acre) and 29 samples from the 6- to 12-inch depth interval (approximately 2 samples per acre). Review of available soil data in this EA indicates that the data coverage is generally sufficient in the 0- to 6-inch depth interval, with exception of the northernmost and southernmost portions of the EA (Figure 4-1, panel B). In the 6- to 12-inch depth interval, data density is lower, resulting in portions of the EA with limited data coverage for that depth interval (Figure 4-1, panel C). GE proposes to collect 20 soil samples from the 0- to 1-foot depth interval within this EA to complete the coverage of the entire top 1 foot of soil, considering the limited accessibility of much of this EA. The locations of those proposed samples are shown on Figure 4-1 (panel D).

### **4.2.2.2 Exposure Area 2**

EA 2 occupies approximately 31 acres consisting of Pittsfield Tax Parcels I6-1-41 and I6-1-27 (both owned by MassDFW), as shown on Figure 4-2 (panel A). EA 2 was classified by EPA as a high-use area and was evaluated in the HHRA and RCMS using the general recreation exposure scenario for older child and adult receptors (RCMS Table 4-1). This EA contains a number of trails, including two maintained utility easements that are evaluated separately as EAs 4 and 61 (see Section 4.2.2.4). EPA also identified two subareas within EA 2 (Subareas 2A and 2B). Subarea 2A is located in the northwest portion of EA 2 and was classified as a low-use general recreation area for older children, and Subarea 2B is an area located near residences and trails that was classified as a high-use general recreation area for older children. Most of EA 2 is considered by EPA to be walkable, and there is no Core Area 1 habitat within this EA. There are no Frequently Used Subareas within this EA.

Previous soil PCB sampling in EA 2 resulted in the analysis of 105 samples from the 0- to 6-inch depth interval (approximately 3.5 samples per acre) and 35 samples from the 6- to 12-inch depth

interval (approximately 1 sample per acre). Review of available soil data in this EA indicates that a majority of the data in the 0- to 6-inch depth interval are located along the northern and eastern boundaries of the EA at a considerable distance away from the river (Figure 4-2, panel B). A similar clustering of the data exists in the 6- to 12-inch depth interval, and the data density in this depth interval is lower. This results in essentially unconstrained polygons in the 6- to 12-inch depth interval within the central and southern portions of the EA, including one large polygon in the southernmost portion of the EA that is generated from a sample on the opposite side of the river (Figure 4-2, panel C). Therefore, GE proposes to collect 25 soil samples from the 0- to 1-foot depth interval within EA 2 (including 3 samples in Subarea 2A and 1 sample in Subarea 2B) to complete the coverage of the entire top 1 foot of soil primarily within the central and southern portions of the EA. The locations of those proposed samples are shown on Figure 4-2 (panel D).<sup>9</sup> Data coverage in Subareas 2A and 2B was generally deemed to be sufficient; however, the samples sited in those areas were selected to supplement the existing data in the 6- to 12-inch depth interval.

#### **4.2.2.3 Exposure Area 3**

EA 3 covers less than 0.4 acre and is located north of EA 2, consisting of a portion of Pittsfield Tax Parcel I6-1-42 (a privately owned residential parcel), as shown on Figure 4-2 (panel A). EA 3 was classified by EPA as a high-use area and was evaluated in the HHRA and RCMS using the general recreation exposure scenario for adult receptors (RCMS Table 4-1). All of EA 3 is walkable, and there is no Core Area 1 habitat or Frequently Used Subareas within this EA.

Previous soil PCB sampling in EA 3 resulted in the analysis of 4 samples from both the 0- to 6-inch and 6- to 12-inch depth intervals (Figure 4-2, panels B and C), which translates to a sampling density of more than 10 samples per acre due to the small size of this EA. The EPC calculated in the RCMS for this EA in the top 1 foot of soil based on the existing data was 7.8 mg/kg, which is nearly a factor of two lower than the Primary Floodplain Performance Standard of 14 mg/kg specified for this EA in the Modified Permit. No additional PDI sampling is proposed for this EA due to the high existing sample density. In addition, because of its distance from the river, it is unlikely that additional sampling would increase the EPC to levels exceeding or approaching the Performance Standard.

#### **4.2.2.4 Exposure Areas 4 and 61**

EA 4 is a 3.2-acre maintained utility easement located in Pittsfield that intersects portions of EA 2 (Pittsfield Tax Parcel I6-1-41), EA 5 (Pittsfield Tax Parcels I6-1-1 and I6-2-1), and EA 7 (Pittsfield residential Tax Parcels I6-3-13 and I6-3-1), as shown on Figure 4-3 (panel A). Because recreational activities were observed in this area, it was classified by EPA as a high-use area and was evaluated in the HHRA and RCMS using the general recreation exposure scenario for young child, older child, and

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<sup>9</sup> Figure 4-2 (panel D) also shows 7 proposed soil sampling locations to a depth of 3 feet within the boundary of EA 2. These samples are located within the Frequently Used Subarea portion of EA 4 and are discussed in Section 4.2.2.4.

adult receptors. This EA also includes an established foot trail that is defined as a Frequently Used Subarea in the Modified Permit. EA 61 is a 3.3-acre utility easement located on Pittsfield Tax Parcel I6-1-27 that is maintained for overhead wires. This EA overlaps the portion of EA 4 that runs north to south and extends farther south to the river. EA 61 was evaluated in the HHRA and RCMS for the utility worker scenario. Both EAs 4 and 61 are considered by EPA to be entirely walkable, and they are located outside of Core Area 1 habitat.

Existing data densities in both EAs were generally sufficient in the 0- to 6-inch depth interval (approximately 4 samples per acre or more); however, sample density for the 6- to 12-inch depth interval was lower (Figure 4-3, panels B and C). Moreover, there are few existing samples in the 1- to 3-foot depth interval, which are needed for calculating a 0- to 3-foot EPC for the Frequently Used Subarea in EA 4 (see Figure 4-3, panel D). Therefore, GE proposes to collect PDI soil samples to a depth of 3 feet at 12 locations in the Frequently Used Subarea to supplement the existing data, as shown on Figure 4-3 (panel D). Soil borings collected at these locations will be segmented into 3 depth intervals per location (0 to 1 foot, 1 to 2 feet, and 2 to 3 feet), for a total of 36 samples. In addition, one 0- to 1-foot sample is proposed in the southernmost portion of EA 61 where data coverage is sparse (Figure 4-3, panel D).

#### **4.2.2.5 Exposure Area 5**

EA 5 is an approximately 2.5-acre area owned by the City of Pittsfield and includes most of Tax Parcels I6-1-1 and I6-2-1, as shown on Figure 4-4 (panel A). EA 5 is transected by the EA 4 utility easement, including the Frequently Used Subarea contained within its boundary (discussed previously in Section 4.2.2.4). EA 5 was classified by EPA as a high-use area and was evaluated in the HHRA and RCMS using the general recreation exposure scenario for older child and adult receptors (RCMS Table 4-1). Approximately 90% of this EA is considered by EPA to be walkable (with the remainder being difficult access), and none of it is considered Core Area 1 habitat.

Previous soil PCB sampling in EA 5 resulted in the analysis of 19 samples from the 0- to 6-inch depth interval (approximately 7.5 samples per acre) and 13 samples from the 6- to 12-inch depth interval (approximately 5 samples per acre). Review of available soil data in this EA indicates that while the sample count is sufficient on a per-acre basis, the spatial coverage of the data is concentrated close to the river and along the EA 4 utility easement (Figure 4-4, panels B and C). Therefore, GE proposes to collect 7 additional soil samples from the 0- to 1-foot depth interval in previously unsampled areas.<sup>10</sup> The locations of those proposed samples are shown on Figure 4-4 (panel D).

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<sup>10</sup> Figure 4-4 (panel D) also shows 2 proposed soil sampling locations to a depth of 3 feet within the boundary of EA 4. Those sample are located within the Frequently Used Subarea portion of EA 4 and were discussed in Section 4.2.2.4.

#### **4.2.2.6 Exposure Area 6**

EA 6 is an approximately 3.8-acre area that consists of a small portion of Pittsfield Tax Parcel I5-1-1 located adjacent to Holmes Road (owned by Miss Hall's School), as shown on Figure 4-5 (panel A). This EA is limited to a relatively narrow area along the river due to steep elevation change. EA 6 was evaluated in the RCMS using the low-use general recreation exposure scenario for adult receptors (RCMS Table 4-1). Most of this EA (approximately 80%) is considered by EPA to be walkable, while the remaining 20% is considered difficult to access. There are no Frequently Used Subareas within this EA, and none of it is considered Core Area 1 habitat.

Previous soil PCB sampling in EA 6 resulted in the analysis of 9 samples from the 0- to 6-inch depth interval (approximately 2.5 samples per acre) and 6 samples from the 6- to 12-inch depth interval (approximately 1.5 samples per acre) (Figure 4-5, panels B and C). Sample density in this EA is relatively low, and better spatial coverage is needed in the relatively narrow strip of "hardwood forest" super habitat along the central and eastern portions of this EA. (PCB concentrations in this super habitat are currently being defined by samples collected in the same habitat on the opposite side of the river and located at considerable distance from the river.) Thus, PDI samples are proposed for this super habitat. Proposed samples were also sited in the "transitional floodplain forest" super habitat on the western side of this EA, primarily to address the lower data density in the 6- to 12-inch depth interval in this area. In total, GE proposes to collect 11 soil samples from the 0- to 1-foot depth interval within this EA to supplement the existing data coverage. The locations of those proposed samples are shown on Figure 4-5 (panel D).

#### **4.2.2.7 Exposure Area 7**

EA 7 is a nearly 6-acre area consisting of portions of Pittsfield Tax Parcels I6-3-1 and I6-3-13 (both privately owned residential parcels), as shown on Figure 4-6 (panel A). EA 7 is also transected by the EA 4 utility easement, including the Frequently Used Subarea located within its boundary (discussed previously in Section 4.2.2.4). EA 7 was classified by EPA as a high-use area and was evaluated in the HHRA and RCMS using the general recreation exposure scenario for older child and adult receptors (RCMS Table 4-1). Most of this EA (approximately 90%) is considered by EPA to be walkable, with the remaining 10% considered difficult to access. None of it is considered Core Area 1 habitat.

Previous soil PCB sampling in EA 7 resulted in the analysis of 25 samples from the 0- to 6-inch depth interval (approximately 4 samples per acre) and 15 samples from the 6- to 12-inch depth interval (approximately 2.5 samples per acre). Sample density and spatial coverage in the 0- to 6-inch depth interval are generally sufficient (Figure 4-6, panel B); however, additional samples are needed to supplement the 6- to 12-inch data coverage, particularly in the portion of the EA closest to the river (i.e., between the river and EA 4) (Figure 4-6, panel C). Additional data are also needed within the "hardwood forest" super habitat located north of EA 4 because the PCB concentration in this area is currently being defined by a data point from the same habitat on the opposite side of the river. GE



proposes to collect 6 soil samples from the 0- to 1-foot depth interval within this EA to supplement the existing data coverage, as shown on Figure 4-6 (panel D). These include 5 samples south of EA 4 and 1 sample in the hardwood forest super habitat north of EA 4.<sup>11</sup>

#### **4.2.2.8 Exposure Area 8**

EA 8 comprises 0.6 acre of Pittsfield Tax Parcel J6-3-2 (owned by the Massachusetts Audubon Society) located adjacent to Holmes Road, as shown on Figure 4-7 (panel A). EA 8 was evaluated in the HHRA and RCMS using the recreational canoeist exposure scenario for older child and adult receptors (RCMS Table 4-1). All of EA 8 is considered by EPA to be walkable, and there is no Core Area 1 habitat or Frequently Used Subareas within it.

Previous soil PCB sampling in EA 8 resulted in the analysis of 12 samples from the 0- to 6-inch depth interval and 6 samples from the 6- to 12-inch depth interval (Figure 4-7, panels B and C), which translate to sampling densities of more than 20 and 10 samples per acre, respectively. While sampling density in this EA is generally sufficient, 2 PDI samples were sited in the “transitional floodplain forest” super habitat to supplement the data coverage for the entire top 1 foot of soil near the river. The locations of those proposed samples are shown on Figure 4-7 (panel D).

#### **4.2.2.9 Exposure Area 9**

EA 9 occupies 0.04 acre of Pittsfield Tax Parcel J6-2-3 (a privately owned residential parcel located along Holmes Road), as shown on Figure 4-7 (panel A). This area was characterized in the HHRA as having a steep slope to the river consisting of cobble and rocks. EA 9 was classified by EPA as a low-use area and was evaluated in the HHRA and RCMS using the general recreation exposure scenario for older child receptors (RCMS Table 4-1). All of EA 9 is considered walkable by EPA, and there is no Core Area 1 habitat or Frequently Used Subareas within it.

No prior soil PCB sampling has been conducted in this EA. However, sampling was conducted in the top 1 foot of soil on Tax Parcel J6-2-3 near the EA boundary as part of the PDI for the Downstream Floodplain Residential Properties, as shown on Figure 4-7 (panels B and C); and GE has agreed to expand the Actual/Potential Lawn on that property to include the triangular northwestern portion of EA 9 and to conduct soil removal in that portion of EA 9, as described in GE’s *Revised Removal Design/Removal Action Work Plan for Floodplain Residential Properties Downstream of the Confluence* (Anchor QEA 2016). Given the existing data from Parcel J6-2-3, there is no need for additional PDI sampling in EA 9.

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<sup>11</sup> Figure 4-6 (panel D) also shows 3 proposed 3-foot samples in the Frequently Used Subarea in EA 4, as discussed in Section 4.2.2.4.

#### **4.2.2.10 Exposure Area 10**

EA 10 is a 59-acre area located along Holmes Road that consists of a portion of Pittsfield Tax Parcel J6-4-2, as shown on Figure 4-8 (panel A). This parcel is owned by the Massachusetts Audubon Society and is the location of the Canoe Meadows Wildlife Sanctuary. EA 10 was classified by EPA as a high-use area and was evaluated in the HHRA and RCMS using the general recreation exposure scenario for young child and adult receptors (RCMS Table 4-1). EA 10 contains a trail network that winds through the woods, fields, and wetlands, and along the edge of the river that EPA has identified as a subarea (Subarea 10A). This subarea was evaluated in the RCMS using the same exposure scenario and receptors evaluated for the main EA. A relatively large portion of this EA (approximately 35%) is considered by EPA to be difficult to access or boatable. Approximately 7.5 acres of the southwest corner of this EA are considered Core Area 1 habitat. There are no Frequently Used Subareas within this EA.

Previous soil PCB sampling in EA 10 resulted in the analysis of 52 samples from the 0- to 6-inch depth interval (less than 1 sample per acre) and 25 samples from the 6- to 12-inch depth interval (less than 0.5 sample per acre) (Figure 4-8, panels B and C). Because of the relatively lower sample density in this EA, GE proposes to collect 19 soil samples from the 0- to 1-foot depth interval to supplement the existing data set. These sample locations are shown on Figure 4-8 (panel D). Specific sample locations were selected primarily in consideration of the various super habitats present within this EA and the lower sample density in the 6- to 12-inch depth interval; sample location selection also took into account the access limitations in a large part of this EA.

#### **4.2.2.11 Exposure Area 11**

EA 11 is a 2.5-acre area that consists of a majority of Pittsfield Tax Parcel J5-2-110 (owned by MassDFW), as shown on Figure 4-9 (panel A). A portion of EA 11 includes a maintained utility easement (evaluated separately as EA 12 that includes a Frequently Used Subarea; see Section 4.2.2.12). EA 11 was classified by EPA as a high-use area and was evaluated in the HHRA and RCMS using the general recreation exposure scenario for adult receptors (RCMS Table 4-1). All of EA 11 is considered walkable by EPA, and there is no Core Area 1 habitat in this area.

Previous soil PCB sampling in EA 11 resulted in the analysis of 18 samples from the 0- to 6-inch depth interval (approximately 7 samples per acre) and 13 samples from the 6- to 12-inch depth interval (approximately 5 samples per acre) (Figure 4-9, panels B and C). Review of available soil data in this EA indicates that the sample density and spatial coverage of existing data in this EA are generally sufficient. However, GE proposes to collect 2 additional soil samples from the 0- to 1-foot

depth interval to supplement the 6- to 12-inch data within the “transitional floodplain forest” super habitat immediately adjacent to the river, as shown on Figure 4-9 (panel D).<sup>12</sup>

#### **4.2.2.12 Exposure Area 12**

As described in the HHRA, EA 12 is a 5.8-acre linear area that consists of two maintained utility easements located in Pittsfield that begin at Holmes Road and extend approximately 1.5 miles downstream to the Pittsfield WWTP. Because of the length of this EA, it is shown on the figures corresponding to the EAs traversed by it (Figures 4-9, 4-10, 4-11, 4-13, 4-14, 4-17, 4-18, and 4-20). The first easement is oriented north-south and crosses portions of multiple state-owned and privately owned parcels, including EAs 11, 13, 16, 17, 19, 23, 24, and 26. The second easement runs east-west across EA 20 (and overlaps EA 63; see Section 4.2.2.20). Both easement areas contain underground pipes. EA 12 was classified by EPA as a high-use area and was evaluated in the HHRA and RCMS using the general recreation exposure scenario for young child, older child, and adult receptors. This EA also includes an established foot trail that is defined as a Frequently Used Subarea in the Modified Permit. Most of EA 12 is considered walkable by EPA and is located outside of Core Area 1 habitat.

Existing data density and spatial coverage for EA 12 (from samples within or adjacent to that EA) are generally good in both the 0- to 6-inch and 6- to 12-inch depth intervals (approximately 6.5 samples per acre) (see panels B and C on Figures 4-9, 4-10, 4-11, 4-13, 4-14, 4-17, 4-18, and 4-20). However, existing samples in the 1- to 3-foot depth interval (required to calculate a 0- to 3-foot EPC for the Frequently Used Subarea) are sparser. Therefore, considering the availability of existing samples in the 1- to 3- foot depth interval (including those collected from adjacent Downstream Floodplain Residential Properties that have polygons extending into this EA) (see panel D on Figures 4-9, 4-10, 4-11, 4-13, 4-14, 4-18, and 4-20), GE proposes to collect PDI soil samples to a depth of 3 feet at 18 locations in the Frequently Used Subarea to supplement the existing data. These proposed sample locations are shown in panel D on Figures 4-9, 4-10, 4-11, 4-13, 4-14, 4-18, and 4-20. Sample locations were selected such that PDI and existing soil samples were spaced at approximately 500-foot intervals along the Frequently Used Subarea in EA 12. Soil borings collected at these locations will be segmented into 3 depth intervals per location (0 to 1 foot, 1 to 2 feet, and 2 to 3 feet), for a total of 54 samples.

#### **4.2.2.13 Exposure Area 13**

EA 13 is an approximately 5.9-acre area located off Holmes Road in Pittsfield and consists of Pittsfield Tax Parcel J5-2-105 (owned by MassDFW) as shown on Figure 4-10 (panel A). EA 13 was classified as a high-use area by EPA and was evaluated in the HHRA and RCMS using the general recreation exposure scenario for adult receptors (RCMS Table 4-1). Approximately half of this EA is

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<sup>12</sup> Figure 4-9 (panel D) also shows 1 proposed soil sample to a depth of 3 feet within the boundary of EA 12. This sample is located within the Frequently Used Subarea portion of EA 12 and is discussed in Section 4.2.2.12.

considered by EPA to be difficult to access, while the remaining portion is considered walkable. There is no Core Area 1 habitat within this EA, and there are no Frequently Used Subareas within it.

Previous soil PCB sampling in EA 13 resulted in the analysis of 23 samples from the 0- to 6-inch depth interval (slightly less than 4 samples per acre) and 9 samples from the 6- to 12-inch depth interval (approximately 1.5 samples per acre). Review of the available soil data indicates that the data coverage (spatial coverage and density) is generally sufficient in the 0- to 6-inch depth interval (Figure 4-10, panel B). However, data density is lower in the 6- to 12-inch depth interval, resulting in portions of the EA with limited data coverage, particularly in the “transitional floodplain forest” super habitat (Figure 4-10, panel C). Therefore, GE proposes to collect 7 soil samples from the 0- to 1-foot depth interval within this EA to complete the coverage of the entire top 1 foot of soil, considering the limited accessibility of much of this EA. The proposed sample locations are shown on Figure 4-10 (panel D).

#### **4.2.2.14 Exposure Area 14**

EA 14 is an approximately 4.1-acre area located along Holmes Road in Pittsfield and consists of a portion of Pittsfield Tax Parcel J5-2-5 (a privately owned residential property), as shown on Figure 4-10 (panel A). EA 14 was classified by EPA as a high-use area and was evaluated in the HHRA and RCMS using the general recreation exposure scenario for adult receptors (RCMS Table 4-1). A relatively large portion of this EA (more than 60%) is considered by EPA to be difficult to access, and the remaining portion is walkable. No part of this EA is considered Core Area 1 habitat, and it contains no Frequently Used Subareas.

Previous soil PCB sampling in EA 14 resulted in the analysis of 12 samples from the 0- to 6-inch depth interval (approximately 3 samples per acre) and only 1 sample from the 6- to 12-inch depth interval (less than 0.5 sample per acre). The EPC calculated in the RCMS for this EA in the top 1 foot of soil based on the existing data was 2.7 mg/kg, which is much lower than the Primary Floodplain Performance Standard of 14 mg/kg specified for this EA in the Modified Permit. The existing data coverage is fair in the 0- to 6-inch depth interval; however, most of the prior sampling focused on the potential vernal pool located within this area (Figure 4-10, panel B). Data density is considerably lower in the 6- to 12-inch depth interval; however, there are existing 6- to 12-inch samples (and 0- to 6-inch samples) in the adjacent Downstream Floodplain Residential Property (Tax Parcel J5-2-10) to the north of this EA (Figure 4-10, panel C). GE proposes to collect 3 soil samples from the 0- to 1-foot depth interval to supplement the existing data set in the top 1 foot of soil. That additional sampling is considered sufficient given that most of this area is considered by EPA to be difficult to access and that the existing EPC is several times lower than the Performance Standard in the Modified Permit. The proposed sample locations are shown on Figure 4-10 (panel D).

#### **4.2.2.15 Exposure Area 15**

EA 15 covers approximately 0.9 acre of Pittsfield Tax Parcel J5-2-6 (owned by MassDFW) along Holmes Road, as shown on Figure 4-10 (panel A). EA 15 was classified by EPA as a high-use area and was evaluated in the HHRA and RCMS using the general recreation exposure scenario for adult receptors (RCMS Table 4-1). Most of this EA (approximately 75%) is considered by EPA to be difficult to access, and the remaining portion is considered walkable. There is no Core Area 1 habitat or Frequently Used Subareas within this EA.

Previous soil PCB sampling in EA 15 resulted in the analysis of 3 samples in both the 0- to 6-inch and 6- to 12-inch depth intervals (approximately 4 samples per acre) (Figure 4-10, panels B and C). The EPC calculated in the RCMS for this EA in the top 1 foot of soil based on the existing data is 2.2 mg/kg, which is much lower than the Primary Floodplain Performance Standard of 14 mg/kg specified in the Modified Permit for this EA. Sample density and spatial coverage in this EA are considered sufficient given that the EA is small (less than 1 acre), that most of it is difficult to access, and that the existing EPC is several times lower than the Performance Standard in the Modified Permit. Therefore, no additional PDI sampling is proposed for this EA.

#### **4.2.2.16 Exposure Area 16**

EA 16 is an approximately 2.5-acre area that consists of a portion of Pittsfield Tax Parcel J5-2-11 (a privately owned residential parcel located along Holmes Road), as shown on Figure 4-11 (panel A). The northwestern border of this EA is defined by the utility easement associated with EA 12. EA 16 was classified by EPA as a high-use area and was evaluated in the HHRA and RCMS using the general recreation exposure scenario for adult receptors (RCMS Table 4-1). The entire EA is walkable, and there are no Frequently Used Subareas within it.

Previous soil PCB sampling in EA 16 resulted in the analysis of 8 samples from the 0- to 6-inch depth interval (approximately 3 samples per acre) and 6 samples from the 6- to 12-inch depth interval (approximately 2.5 samples per acre). Review of the available soil data indicates that the data density is somewhat low in both the 0- to 6-inch and 6- to 12-inch depth intervals and that most of the existing samples are located in the northern half of the EA (Figure 4-11, panels B and C). To supplement the existing data set, GE proposes to collect 4 soil samples from the 0- to 1-foot depth interval within the southern half of this EA, as shown on Figure 4-11 (panel D).

#### **4.2.2.17 Exposure Area 17**

EA 17 is an approximately 8.5-acre area consisting of a portion of Pittsfield Tax Parcel J5-2-4 (a privately owned residential parcel), as shown on Figure 4-11 (panel A). The western portion of this EA consists of the utility easement included in EA 12. EA 17 was classified by EPA as a high-use area and was evaluated in the HHRA and RCMS using the general recreation exposure scenario for adult receptors (RCMS Table 4-1). Nearly all of this EA is considered by EPA to be walkable. EA 17 also

contains approximately 1.8 acres of Core Area 1 habitat (immediately adjacent to the river). There are no Frequently Used Subareas within this EA.

Previous soil PCB sampling in EA 17 resulted in the analysis of 21 samples from the 0- to 6-inch depth interval (approximately 2.5 samples per acre) and 8 samples from the 6- to 12-inch depth interval (nearly 1 sample per acre). The available soil data in the 0- to 6-inch depth interval are generally sufficient (in terms of density and spatial coverage) when considered together with nearby data outside this EA that have polygons extending into this EA (Figure 4-11, panel B). However, data density is lower in the 6- to 12-inch depth interval, and most samples are located in the western half of this EA (Figure 4-11, panel C). Therefore, GE proposes to collect 4 soil samples from the 0- to 1-foot depth interval within the eastern half of this EA along with 1 sample within the uncharacterized "emergent marsh and wet meadow" super habitat, for a total of 5 samples, as shown on Figure 4-11 (panel D). These proposed samples, along with existing data and proposed PDI samples from adjacent EAs 16 and 19, will complete the data coverage for the top 1 foot of soil within EA 17.

#### **4.2.2.18 Exposure Area 18**

EA 18 covers approximately 17 acres along East New Lenox Road and consists of a portion of Pittsfield Tax Parcel J3-2-203 (owned by GE), as shown on Figure 4-12 (panel A). EA 18 was classified by EPA as a medium-use area and was evaluated in the HHRA and RCMS using the general recreation exposure scenario for adult receptors (RCMS Table 4-1). Nearly 40% of this EA (located primarily in the western half) is considered by EPA to be difficult to access or boatable. EA 18 contains 4.3 acres of Core Area 1 habitat, and there are no Frequently Used Subareas within this EA.

Previous soil PCB sampling in EA 18 resulted in the analysis of 12 samples from the 0- to 6-inch depth interval (less than 1 sample per acre) and 5 samples from the 6- to 12-inch depth interval (less than 0.5 sample per acre). Data density is low in both the 0- to 6-inch and 6- to 12-inch depth intervals, and the existing sample locations are not well distributed throughout the EA (Figure 4-12, panels B and C). Therefore, GE proposes to collect 14 soil samples from the 0- to 1-foot depth interval throughout this EA to supplement the existing data set, as shown on Figure 4-12 (panel D). The proposed PDI sampling density is somewhat higher in the western half of the EA (i.e., in the portion of the EA closer to the river that is inundated more frequently), and it excludes the boatable portion of the EA.

#### **4.2.2.19 Exposure Areas 19 and 62**

EA 19 corresponds to the 36-acre Pittsfield Tax Parcel J4-3-13 (owned by MassDFW), as shown on Figure 4-13 (panel A). Two utility easements run across this area, including the north-south easement that delineates the western boundary of this EA (described previously as EA 12), and a second easement running east-west, defined as EA 62. EA 19 was classified by EPA as a high-use area and was evaluated in the HHRA and RCMS using the general recreation exposure scenario for adult

receptors, while the utility easement (EA 62) was evaluated for the utility worker scenario (RCMS Table 4-1). Approximately 20% of this EA is considered by EPA to be difficult to access or boatable. Nearly 70% of EA 19 is considered Core Area 1 habitat. There are no Frequently Used Subareas within this EA.

Previous soil PCB sampling in EA 19 resulted in the analysis of 108 samples from the 0- to 6-inch depth interval (3 samples per acre) and 18 samples from the 6- to 12-inch depth interval (0.5 sample per acre). Review of the available soil data in this EA indicates that the data are not evenly distributed across the EA, and density is notably low in the 6- to 12-inch depth interval (Figure 4-13, panels B and C). Therefore, GE proposes to collect 14 soil samples from the 0- to 1-foot depth interval throughout EA 19 to complete the coverage of the top 1 foot of soil. The proposed sample locations are shown on Figure 4-13 (panel D). The additional samples, together with the existing data, will also provide adequate data coverage for EA 62.

#### **4.2.2.20 Exposure Areas 20 and 63**

EA 20 is an approximately 9.1-acre area consisting primarily of Pittsfield Tax Parcel J4-3-12 (owned by MassDFW), as shown on Figure 4-14 (panel A). Two utility easements run across this area, including the north-south easement described previously as EA 12 that marks its western boundary and a second easement running east-west along the northern border of EA 20, defined as EA 63 but also overlapping with EA 12 (discussed in Section 4.2.2.12). EA 20 was classified by EPA as a high-use area and was evaluated in the HHRA and RCMS using the general recreation exposure scenario for adult receptors, while the utility easement (EA 63) was evaluated for the utility worker scenario (RCMS Table 4-1). Nearly 40% of this EA is considered by EPA to be difficult to access or boatable. Approximately 2.5 acres of the northern portion of EA 20 is considered Core Area 1 habitat, including nearly all of EA 63. There are no Frequently Used Subareas in EA 20; however, the EA 63 easement that overlaps with EA 12 includes the Frequently Used Subarea associated with EA 12.

Previous soil PCB sampling in EA 20 resulted in the analysis of 33 samples from the 0- to 6-inch depth interval (approximately 3.5 samples per acre) and 16 samples from the 6- to 12-inch depth interval (less than 2 samples per acre). Most of the existing data in this EA are located in the northernmost portion (including along the EA 63 utility easement) (Figure 4-14, panels B and C). GE proposes to collect 18 soil samples from the 0- to 1-foot depth interval within this EA to complete the coverage of the top 1 foot of soil. The proposed sampling focuses primarily on the lower two-thirds of the EA and targets samples in each of the various super habitats present within this EA. The proposed sample locations are shown on Figure 4-14 (panel D).<sup>13</sup>

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<sup>13</sup> Figure 4-14 (panel D) also shows 2 proposed 3-foot samples in the EA 63 utility easement that overlaps with EA 12; these samples are associated with the Frequently Used Subarea in EA 12, as discussed in Section 4.2.2.12.

#### **4.2.2.21 Exposure Area 21**

EA 21 is an approximately 2.9-acre area located off East New Lenox Road in Pittsfield and covers a portion of Pittsfield Tax Parcel J3-2-203 (owned by GE), as shown on Figure 4-15 (panel A). EA 21 was classified as a high-use area by EPA and was evaluated in the HHRA and RCMS using the general recreation exposure scenario for older child and adult receptors (RCMS Table 4-1). All of EA 21 is considered walkable by EPA, and it contains no Frequently Used Subareas.

Previous soil PCB sampling in EA 21 resulted in the analysis of 11 samples from the 0- to 6-inch depth interval (approximately 4 samples per acre) and 6 samples from the 6- to 12-inch depth interval (2 samples per acre) (Figure 4-15, panels B and C). While data density within this EA is somewhat low, the data coverage is supplemented by historical samples located just outside its boundary in the adjacent EA 22, resulting in polygons extending into EA 21. Considering existing sample locations in adjacent EAs, the spatial distribution of samples is sufficient in both the 0- to 6-inch and 6- to 12-inch depth intervals in EA 21. Therefore, no additional PDI sampling is proposed for this EA.

#### **4.2.2.22 Exposure Area 22**

EA 22 is a 19-acre area located off East New Lenox Road that consists of a portion of Pittsfield Tax Parcel J3-2-203 (owned by GE), as shown on Figure 4-16 (panel A). EA 22 was evaluated in the HHRA and RCMS using the high-use general recreation exposure scenario for older child and adult receptors (RCMS Table 4-1). This EA contains dirt-bike riding trails in the northern portion that EPA has identified as a subarea (Subarea 22A). This subarea was evaluated in the RCMS using the dirt biking/ATVing exposure scenario for older child receptors. Nearly 30% of EA 22 is considered by EPA to be difficult to access. None of it is considered Core Area 1 habitat, and there are no Frequently Used Subareas within this EA.

Previous soil PCB sampling in EA 22 resulted in the analysis of 30 samples from the 0- to 6-inch depth interval (approximately 1.5 samples per acre) and 11 samples from the 6- to 12-inch depth interval (approximately 0.5 sample per acre) (Figure 4-16, panels B and C). Because of the relatively low sample density over most of this EA and subarea, GE proposes to collect 42 soil samples from the 0- to 1-foot depth interval to supplement the existing data set, with 5 of those samples located in Subarea 22A. The proposed sample locations are shown on Figure 4-16 (panel D). Specific sample locations were selected primarily in consideration of the various super habitats present within this EA and in consideration of the difficult-to-access areas.

#### **4.2.2.23 Exposure Area 23**

EA 23 is an approximately 0.28-acre area that covers small portions of several privately owned Pittsfield Tax Parcels (J3-1-11, J3-1-12, J3-1-13, and J3-1-14), as shown on Figure 4-17 (panel A). EA 23 was classified as a medium-use area by EPA and was evaluated in the HHRA and RCMS using the general recreation exposure scenario for older child receptors (RCMS Table 4-1). Approximately



75% of this EA is considered by EPA to be walkable while the remainder is considered boatable, and it contains no Frequently Used Subareas.

Previous soil PCB sampling in EA 23 resulted in the analysis of 14 samples from the 0- to 6-inch depth interval (approximately 49 samples per acre) and 10 samples from the 6- to 12-inch depth interval (approximately 35 samples per acre) (Figure 4-17, panels B and C). The EPC calculated in the RCMS for this EA in the top 1 foot of soil based on the existing data was 11 mg/kg, which is much lower than the Primary Floodplain Performance Standard of 40 mg/kg for this EA. The existing data density and spatial coverage are adequate in both the 0- to 6-inch and 6- to 12-inch depth intervals, particularly since the existing EPC was several times lower than the Performance Standard. Therefore, no additional PDI sampling is proposed for this EA.

#### **4.2.2.24 Exposure Area 24**

EA 24 is an approximately 10-acre area that consists of portions of Pittsfield Tax Parcels J3-1-6 and J3-1-7 (owned by MassDFW), as shown on Figure 4-18 (panel A). EA 24 was classified as a high-use area by EPA and was evaluated in the HHRA and RCMS using the general recreation exposure scenario for adult receptors (RCMS Table 4-1). Nearly 40% of this EA is considered by EPA to be difficult to access, and there are no Frequently Used Subareas in it.

Previous soil PCB sampling in EA 24 resulted in the analysis of 40 samples from the 0- to 6-inch depth interval (approximately 4 samples per acre) and 6 samples from the 6- to 12-inch depth interval (approximately 0.5 sample per acre). Existing data density and spatial coverage in this EA are generally sufficient in the 0- to 6-inch depth interval (Figure 4-18, panel B); however, few samples were collected from the 6- to 12-inch depth interval (Figure 4-18, panel C). Therefore, GE proposes to collect 17 soil samples (0- to 1-foot depth intervals), distributed relatively uniformly throughout this EA, to supplement the existing data coverage for the entire top 1 foot of soil. The proposed sample locations are shown on Figure 4-18 (panel D).<sup>14</sup>

#### **4.2.2.25 Exposure Area 25**

EA 25 covers approximately 0.51 acre within portions of privately owned Pittsfield Tax Parcels J3-2-2, J3-2-3, J3-2-4, J3-2-5, and J3-2-6, as shown on Figure 4-19 (panel A). EA 25 was classified as a high-use area by EPA and was evaluated in the HHRA and RCMS using the general recreation exposure scenario for older child receptors (RCMS Table 4-1). All of this EA is considered walkable by EPA, and it contains no Frequently Used Subareas.

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<sup>14</sup> Figure 4-18 (panel D) also shows 5 proposed soil sampling location to a depth of 3 feet within the boundary of EA 12. These samples are located within the Frequently Used Subarea portion of EA 12 and were discussed in Section 4.2.2.12.

Previous soil PCB sampling in EA 25 resulted in the analysis of 16 samples from the 0- to 6-inch depth interval (approximately 32 samples per acre) and 15 samples from the 6- to 12-inch depth interval (approximately 30 samples per acre) (Figure 4-19, panels B and C). The existing data density and spatial coverage are adequate in both the 0- to 6-inch and 6- to 12-inch depth intervals. Therefore, no additional PDI sampling is proposed for this EA.

#### **4.2.2.26 Exposure Area 26**

EA 26 is a 55-acre portion of Pittsfield Tax Parcel J2-2-2 (owned by MassDFW), as shown on Figure 4-20 (panel A). A maintained utility easement runs across the western portion of this area (described previously as part of EA 12). EA 26 was divided by EPA in the HHRA into two subareas based on the different activities that occur in each: Subarea 26A is the portion that is used for recreational activities; and Subarea 26B is the portion used for agricultural purposes. The full EA (EA 26) and Subarea 26A were both classified as high-use by EPA and were evaluated in the HHRA and RCMS using the general recreation exposure scenario for older child and adult receptors (RCMS Table 4-1). Subarea 26B was also evaluated for direct contact by a farmer. EA 26A also contains a network of trails that is defined in the Modified Permit as a Frequently Used Subarea. More than half of the area is classified by EPA as walkable, while the remainder is considered by EPA to be difficult to access or boatable. EA 26 contains nearly 13 acres of Core Area 1 habitat.

Previous soil PCB sampling in EA 26 resulted in the analysis of 130 samples from the 0- to 6-inch depth interval (approximately 2.5 samples per acre) and 31 samples from the 6- to 12-inch depth interval (approximately 0.5 sample per acre). A large percentage of these samples were collected in Subarea 26B, so no additional PDI samples are proposed for that subarea. The EPCs calculated in the RCMS for EA 26 and Subarea 26A in the top 1 foot of soil based on the existing data are 6.1 mg/kg and 7.0 mg/kg, respectively; these EPCs are a factor of two lower than the Primary Floodplain Performance Standard of 14 mg/kg specified for these areas in the Modified Permit. Existing data density and spatial coverage in Subarea 26A are generally sufficient in the 0- to 6-inch depth interval (Figure 4-20, panel B); however, few samples were collected from the 6- to 12-inch depth interval (Figure 4-20, panel C). GE proposes to collect 6 soil samples from the 0- to 1-foot depth interval in Subarea 26A to supplement the existing data coverage for the entire top 1 foot of soil. The proposed sample locations are shown on Figure 4-20 (panel D). This proposed density of PDI samples was selected because the areas with low existing sample density in the 6- to 12-inch depth interval are located primarily within difficult-to-access areas and because the existing EPCs are well below the Performance Standard in the Modified Permit. GE also proposes to collect samples to a depth of 3 feet at 3 locations within the Frequently Used Subarea (where no such deeper samples currently exist), as also shown on Figure 4-20 (panel D), to define PCB concentrations in the top 3 feet of soil in

that area.<sup>15</sup> These samples will be segmented into 0- to 1-foot, 1- to 2-foot, and 2- to 3-foot depth intervals for analysis.

#### **4.2.2.27 Exposure Area 27**

EA 27 is an approximately 6.3-acre area that consists of a portion of Tax Parcel K3-1-19 (owned by the City of Pittsfield), as shown on Figure 4-21 (panel A). EA 27 was classified as a high-use area by EPA and was evaluated in the HHRA and RCMS using the general recreation exposure scenario for older child and adult receptors (RCMS Table 4-1). This area also contains dirt bike and ATV trails that were designated as Subarea 27A. This subarea was evaluated in the HHRA and RCMS for the dirt biking/ATVing exposure scenario. A small portion of this area is considered by EPA to be difficult to access (less than 15%), and the EA contains no Core Area 1 habitat or Frequently Used Subareas.

Previous soil PCB sampling in EA 27 resulted in the analysis of 13 samples from the 0- to 6-inch depth interval (approximately 2 samples per acre) and only 1 sample from the 6- to 12-inch depth interval. The EPCs calculated for EA 27 and Subarea 27A in the RCMS in the top 1 foot of soil based on the existing data are 2.5 mg/kg and 4.3 mg/kg, both of which are considerably lower than the Primary Floodplain Performance Standard of 14 mg/kg specified for both areas in the Modified Permit. Spatial coverage of data in the 0- to 6-inch depth interval is relatively good, but data density is somewhat low (Figure 4-21, panel B). In addition, data in this area within the 6- to 12-inch depth interval are limited to a single sample; and as a result, Thiessen polygons in the 6- to 12-inch depth interval in this EA were generated from samples collected on the opposite side of the river (Figure 4-21, panel C). Considering the existing data and the comparison of the existing EPCs to the Performance Standard in the Modified Permit, GE proposes to collect 8 soil samples from the 0- to 1-foot depth interval within this EA, including 2 in Subarea 27A, to supplement the existing data set. The proposed sample locations are shown on Figure 4-21 (panel D).

#### **4.2.2.28 Exposure Area 28**

EA 28 is an approximately 0.21-acre area that consists of privately owned Pittsfield Tax Parcel K3-1-2, as shown on Figure 4-22 (panel A). EA 28 was classified as a high-use area by EPA and was evaluated in the HHRA and RCMS using the general recreation exposure scenario for young child, older child, and adult receptors (RCMS Table 4-1). This area also contains dirt bike and ATV trails that were designated as Subarea 28A. This subarea was evaluated in the HHRA and RCMS for the dirt biking/ATVing exposure scenario. The entire area is considered by EPA to be walkable, and it contains no Frequently Used Subareas.

Previous soil PCB sampling in EA 28 resulted in the analysis of 4 samples from both the 0- to 6-inch and 6- to 12-inch depth intervals (approximately 19 samples per acre). One of those samples is

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<sup>15</sup> Figure 4-20 (panel D) also shows 5 proposed soil sampling locations to a depth of 3 feet within the boundary of EA 12. These samples are located within the Frequently Used Subarea portion of EA 12 and were discussed in Section 4.2.2.12.

located in Subarea 28A. Review of the available soil data in the main EA (EA 28) indicates that the data coverage is generally sufficient in both the 0- to 6-inch and 6- to 12-inch depth intervals (Figure 4-22, panels B and C). However, GE proposes to collect 1 soil sample from the 0- to 1-foot depth interval within Subarea 28A, as shown on Figure 4-22 (panel D), to provide an additional sample in this area.

#### **4.2.2.29 Exposure Area 29**

EA 29 is an approximately 0.34-acre portion of Pittsfield Tax Parcel K3-1-1 (owned by MassDFW), as shown on Figure 4-22 (panel A). EA 29 was classified as a low-use area by EPA and was evaluated in the HHRA and RCMS using the general recreation exposure scenario for older child and adult receptors (RCMS Table 4-1). Approximately 60% of this EA is classified by EPA as difficult to access, and the EA contains no Frequently Used Subareas.

Previous soil PCB sampling in EA 29 resulted in the analysis of 5 samples from the 0- to 6-inch depth interval (approximately 15 samples per acre) and 3 samples from the 6- to 12-inch depth interval (approximately 9 samples per acre) (Figure 4-22, panels B and C). Data density is generally sufficient in both the 0- to 6-inch and 6- to 12-inch depth intervals; however, the 6- to 12-inch samples were collected near the southern end of EA 29 (Figure 4-22, panel C). Therefore, GE proposes to collect 2 soil samples from the 0- to 1-foot depth interval (one more towards the middle and one at the northern end of this EA) to supplement the existing data, as shown on Figure 4-22 (panel D).

#### **4.2.2.30 Exposure Area 30**

EA 30 is an approximately 0.19-acre portion of privately owned Pittsfield Tax Parcel K2-1-10, as shown on Figure 4-22 (panel A). EA 30 was classified as a high-use area by EPA and was evaluated in the HHRA and RCMS using the general recreation exposure scenario for older child and adult receptors (RCMS Table 4-1). The entire EA is considered by EPA to be walkable, and it contains no Frequently Used Subareas.

Previous soil PCB sampling in EA 30 resulted in the analysis of 4 samples from the 0- to 6-inch depth interval (approximately 21 samples per acre) and 3 samples from the 6- to 12-inch depth interval (approximately 16 samples per acre) (Figure 4-22, panels B and C). Review of the available soil data in this EA indicates that the data density is generally sufficient in both the 0- to 6-inch and 6- to 12-inch depth intervals; however, the 6- to 12-inch samples were collected near the northern end of the property (Figure 4-22, panel C). Therefore, GE proposes to collect 1 soil sample from the 0- to 1-foot depth interval at the southern end of this EA to supplement the existing data, as shown on Figure 4-22 (panel D).

#### **4.2.2.31 Exposure Areas 31 and 64**

EA 31 is an approximately 5-acre area located along East New Lenox Road consisting of portions of Pittsfield Tax Parcels K2-1-3 and K2-1-5 (owned by MassDFW) and K2-1-4 (owned by the City of

Pittsfield), as shown on Figure 4-23 (panel A). Parcel K2-1-4 is a 0.6-acre maintained utility easement area that contains an underground pipe. Although this area comprises a utility easement, recreational activities were observed here during the HHRA. Therefore, the HHRA designated this easement area as Subarea 31A for the purposes of evaluating recreational exposure and as EA 64 for the evaluation of exposure to utility workers. The HHRA classified the main EA (EA 31) and Subarea 31A as high-use general recreation areas that were evaluated for older child and adult receptors (RCMS Table 4-1). EA 64 was evaluated for the utility worker scenario. Approximately 20% of EA 31, situated in the southern portion, is considered by EPA as difficult to access; and the EA contains no Core Area 1 habitat or Frequently Used Subareas.

Previous soil PCB sampling in EA 31 resulted in the analysis of 12 samples from the 0- to 6-inch depth interval (approximately 2.5 samples per acre) and 6 samples from the 6- to 12-inch depth interval (approximately 1 sample per acre). The existing sample density is somewhat low in the 0- to 6-inch depth interval in EA 31, although spatial coverage is generally good (Figure 4-23, panel B). The existing data in the 6- to 12-inch depth interval are limited only to areas near the river (Figure 4-23, panel C). In addition, no samples have been collected directly within EA 64/Subarea 31A. Considering the existing data coverage and the access difficulties in the southern part of the EA, GE proposes to collect 5 soil samples from the 0- to 1-foot depth interval within EA 31, including 1 sample in EA 64/Subarea 31A, to supplement the existing data. The proposed sample locations are shown on Figure 4-23 (panel D).

#### **4.2.2.32 Exposure Area 32**

EA 32 is an approximately 6.8-acre area located along East New Lenox Road, consisting of a portion of Pittsfield Tax Parcel K2-1-1 (owned by MassDFW), as shown on Figure 4-24 (panel A). EA 32 was classified as a high-use area by EPA and was evaluated in the HHRA and RCMS using the general recreation exposure scenario for adult receptors (RCMS Table 4-1). More than half of this EA (approximately 60%) is considered by EPA as difficult to access, and it contains no Core Area 1 habitat or Frequently Used Subareas.

Previous soil PCB sampling in EA 32 resulted in the analysis of 10 samples from the 0- to 6-inch depth interval (approximately 1.5 samples per acre) and 4 samples from the 6- to 12-inch depth interval (approximately 0.5 sample per acre). Most of the existing data in the 0- to 6-inch depth interval in this EA are located relatively close to the river (within the “transitional floodplain forest” super habitat), and there are only limited 6- to 12-inch data in this area (Figure 4-24, panels B and C). Considering the limited accessibility of most of this EA, GE proposes to collect 4 soil samples from the 0- to 1-foot depth interval within the “transitional floodplain forest” super habitat to supplement the existing data coverage, plus 2 additional samples within the area that is considered difficult to access, for a total of 6 samples. The proposed sample locations are shown on Figure 4-24 (panel D).

#### **4.2.2.33 Exposure Area 33**

EA 33 is an approximately 30-acre area that consists of a portion of Pittsfield Tax Parcel J2-2-1, which is the site of the Pittsfield WWTP (owned by the City of Pittsfield), as shown on Figure 4-25 (panel A). Because the portion of the property within the 1 mg/kg PCB isopleth contains a number of trails and service roads, EA 33 is considered a high-use area and was evaluated in the RCMS using the general recreation exposure scenario for adult receptors (RCMS Table 4-1). More than 70% of this EA is considered by EPA to be walkable, with the remainder considered by EPA as difficult to access or boatable. None of this EA is considered Core Area 1 habitat, and it contains no Frequently Used Subareas.

Previous soil PCB sampling in EA 33 resulted in the analysis of 39 samples from the 0- to 6-inch depth interval (approximately 1.5 samples per acre) and 7 samples from the 6- to 12-inch depth interval (less than 0.5 sample per acre) (Figure 4-25, panels B and C). Because of the relatively low data density, particularly within the 6- to 12-inch depth interval, GE proposes to collect 18 soil samples from the 0- to 1-foot depth interval to supplement the existing data set, as shown on Figure 4-25 (panel D). A majority of the proposed sample locations are in areas that are considered walkable, but a few samples are situated in the difficult-to-access areas.

#### **4.2.2.34 Exposure Area 34**

EA 34 is an approximately 7.8-acre area located along East New Lenox Road that consists of a portion of Pittsfield Tax Parcel K1-1-109 (owned by GE), as shown on Figure 4-26 (panel A). EA 34 is considered a medium-use area and was evaluated in the RCMS using the general recreation exposure scenario for adult receptors (RCMS Table 4-1). Nearly all of this EA (approximately 95%) is considered walkable by EPA, none of it is considered Core Area 1 habitat, and it contains no Frequently Used Subareas.

Previous soil PCB sampling in EA 34 resulted in the analysis of 23 samples from the 0- to 6-inch depth interval (approximately 3 samples per acre) and 10 samples from the 6- to 12-inch depth interval (approximately 1.5 samples per acre). While existing sample density in the 0- to 6-inch depth interval is somewhat low in portions of EA 34, spatial coverage is generally good except for a few places where PCB concentrations in the relatively narrow band of “transitional floodplain forest” near the river shoreline are derived from samples on the opposite side of the river (Figure 4-26, panel B). In addition, there is limited data coverage in the 6- to 12-inch depth interval (Figure 4-26, panel C). To supplement the existing data coverage, GE proposes to collect 8 soil samples from the 0- to 1-foot depth interval within this EA, as shown on Figure 4-26 (panel D).

#### **4.2.2.35 Summary**

The pre-design PCB soil sampling proposed herein will involve the collection of 371 soil samples from 305 locations within the EAs in the Reach 5A floodplain. Table 4-1 provides a summary of the number of proposed PDI sample locations (0 to 1 foot and 0 to 3 feet) for each EA.

**Table 4-1**  
**Summary of Proposed Floodplain PDI Sampling**

EA	Parcel(s)	Owner	Number of Existing Samples		Number of Proposed PDI Sampling Locations	
			0–6 inches	6–12 inches	1-foot	3-foot
1	H6-4-105	MassDFW	64	29	20	—
2	I6-1-41	MassDFW	105	35	25	—
	I6-1-27	MassDFW				
3	I6-1-42	Private	4	4	—	—
4 and 61	<i>Many: covered by other EAs</i>	<i>State and private ownership</i>	33	10	1	12
5	I6-1-1	City of Pittsfield	19	13	7	—
	I6-2-1	City of Pittsfield				
6	I5-1-1	Private	9	6	11	—
7	I6-3-1	Private	25	15	6	—
	I6-3-13	Private				
8	J6-3-2	Massachusetts Audubon Society	12	6	2	—
9	J6-2-3	Private	—	—	—	—
10	J6-4-2	Massachusetts Audubon Society	52	25	19	—
11	J5-2-110	MassDFW	18	13	2	—
12	<i>Many: covered by other EAs</i>	<i>State and private ownership</i>	32	32	—	18
13	J5-2-105	MassDFW	23	9	7	—
14	J5-2-5	Private	12	1	3	—
15	J5-2-6	MassDFW	3	3	—	—
16	J5-2-11	Private	8	6	4	—
17	J5-2-4	Private	21	8	5	—
18	J3-2-203	General Electric	12	5	14	—
19 and 62	J4-3-13	MassDFW	114	20	14	—
20 and 63	J4-3-12	MassDFW	38	20	18	—
21	J3-2-203	General Electric	11	6	—	—
22	J3-2-203	General Electric	30	11	42	—
23	J3-1-11	Private	14	10	—	—
	J3-1-12	Private				
	J3-1-13	Private				
	J3-1-14	Private				
24	J3-1-6	MassDFW	40	6	17	—
	J3-1-7	MassDFW				
25	J3-2-2	Private	16	15	—	—
	J3-2-3	Private				
	J3-2-4	Private				
	J3-2-5	Private				
	J3-2-6	Private				
26	J2-2-2	MassDFW	130	31	6	3
27	K3-1-19	City of Pittsfield	13	1	8	—
28	K3-1-2	Private	4	4	1	—
29	K3-1-1	MassDFW	5	3	2	—
30	K2-1-10	Private	4	3	1	—
31 and 64	K2-1-3	MassDFW	14	6	5	—
	K2-1-4	City of Pittsfield				
	K2-1-5	MassDFW				
32	K2-1-1	MassDFW	10	4	6	—
33	J2-2-1	City of Pittsfield	39	7	18	—
34	K1-1-109	General Electric	23	10	8	—
<b>Total</b>			<b>957</b>	<b>377</b>	<b>272</b>	<b>33</b>

### 4.2.3 *Sampling and Analytical Procedures*

Standard operating procedures and quality assurance (QA)/quality control (QC) requirements for floodplain soil sample collection will be presented in the Rest of River FSP/QAPP (in development), and field activities will be conducted in accordance with the *Site Health and Safety Plan, GE-Pittsfield/Housatonic River Site – Rest of River* (GE 2017). The sampling crew will locate proposed sampling locations using a Differential Global Positioning System (DGPS). It may be necessary to adjust some of the target sampling locations identified in this Floodplain PDI Work Plan based on conditions encountered in the field (e.g., some proposed locations in difficult access areas may be impossible to access, or an obstruction may be present at a proposed location). Any adjustment to target sampling locations will be discussed with and approved by the EPA field representative, and coordinates of the actual sampling locations will be recorded using DGPS.

Each floodplain soil sample collected will be analyzed for PCB as Aroclors using EPA Method 8082 with analytical detection and reporting limits presented in the Rest of River FSP/QAPP. Analytical results will be provided to GE in accordance with a standard laboratory turnaround time of 20 business days from verified time of sample receipt.

## 4.3 **Survey Activities**

In addition to the soil sampling activities discussed in Section 4.2, survey activities will be conducted by GE as part of the pre-design investigations to support evaluation of the soil PCB data and future technical evaluations to be conducted as part of remedial design. These include the performance of surveys to identify vernal pools in the Reach 5A floodplain and surveys to support calculation of EPCs and future delineation of floodplain remediation areas.

### 4.3.1 *Identification of Potential Vernal Pools*

Section II.B.3.b.(2)(a) of the Modified Permit requires GE to submit a plan and, upon EPA approval, conduct one or more site visits to identify potential vernal pools in the floodplain. EPA will determine which of those areas constitute vernal pools, and GE will then carry out additional soil/sediment sampling and other characterization efforts in the vernal pools specified by EPA.<sup>16</sup> This section sets forth GE's plan to identify potential vernal pools in the Reach 5A floodplain.

#### 4.3.1.1 **Background and Criteria**

The Massachusetts Wetlands Protection Act (WPA) defines vernal pool habitat as "confined basin depressions which, at least in most years, hold water for a minimum of two continuous months during the spring and/or summer, and which are free of adult fish populations.... These areas are

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<sup>16</sup> An assessment of the need for and extent of additional soil PCB sampling within vernal pools will be conducted after vernal pools are identified and specified by EPA, and will be described in a future Supplemental PDI Work Plan.



essential breeding habitat, and provide other extremely important wildlife habitat functions during non breeding season as well, for a variety of amphibian species such as wood frog (*Rana sylvatica*) and the spotted salamander (*Ambystoma maculatum*), and are important habitat for other wildlife species” (310 CMR 10.04). The MassDFW Natural Heritage and Endangered Species Program (NHESP) describes vernal pools as “temporary bodies of fresh water that provide important habitat for many vertebrate and invertebrate species” (MassDFW NHESP 2009).

As of 2009, the MassDFW has a vernal pool certification process based on the features found in a pool (MassDFW NHESP 2009). Certification is based on evidence that a pool provides important wildlife habitat consistent with “vernal pool habitat” in the WPA. Under this process, wildlife that use vernal pools are generally divided into the following two groups:

- **Obligate species** are vertebrate and invertebrate species that *require* vernal pools for all or a portion of their life cycle and are unable to successfully complete their life cycle without vernal pools.<sup>17</sup> Obligate species serve as *direct* indicators of vernal pool habitat because they require at least 2 months of flooded conditions and the absence of established, reproducing fish populations. When breeding evidence of obligate species is documented, it is not necessary to prove that there is no established fish population. However, a pool with obligate species must still meet the requisite physical criteria of having “no permanently flowing outlet” to be certifiable as a vernal pool.
- **Facultative species** are vertebrate and invertebrate species that frequently use vernal pools for all or a portion of their life cycle but are able to successfully complete their life cycle in other types of wetlands.<sup>18</sup> Facultative amphibian species serve as *indirect* indicators of vernal pool habitat. Documentation of the appropriate facultative amphibian species does not ensure certification; evidence documenting there is no established, reproducing fish population must also be submitted. Additionally, the physical documentation (e.g., pool photos, descriptive notes) must demonstrate that the pool possesses the physical characteristics necessary to sustain a vernal pool environment (e.g., depth, size, vegetation).

Vernal pool certification is possible only after the appropriate biological *and* physical criteria have been met and documented by one of the two certification methods specified by MassDFW (Obligate Species Method or Facultative Species Method) as described below.

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<sup>17</sup> Obligate vernal pool species in Massachusetts are wood frogs, spotted salamander, blue-spotted salamander (*Ambystoma laterale*), Jefferson salamander (*Ambystoma jeffersonianum*), marbled salamander (*Ambystoma opacum*), and fairy shrimp (*Branchiopoda anostraca*).

<sup>18</sup> Facultative vernal pool species in Massachusetts are spring peeper (*Pseudacris crucifer*), gray treefrog (*Hyla versicolor*), American toad (*Anaxyrus americanus*), and fowler’s toad (*Anaxyrus fowleri*).

### **Obligate Species Method**

Under this method, the presence of obligate amphibian species is documented through evidence of breeding. Observations of one or more of the following from at least one obligate species satisfy this biological criterion:

1. Adult wood frogs in full chorus or 5+ mated pairs;
2. Adult salamander spermatophores, salamanders in congress, or a marbled salamander attending a nest;
3. Five egg masses of any combination of obligate species present in the pool or 1 egg mass of a Massachusetts Endangered Species Act-listed salamander, or nest and eggs of a marbled salamander;
4. Any number of amphibian larvae;
5. Metamorphosing amphibian juveniles still in the pool that have tail and/or gill remnants; or
6. The presence of fairy shrimp within the pool.

To meet the vernal pool criteria for certification in Massachusetts using the Obligate Species Method, the pool must also have "no permanently flowing outlet."

### **Facultative Species Method**

Under this second optional method, the presence of facultative amphibian species is documented through evidence of breeding. Observations of one or more of the following from at least two facultative species are needed to satisfy this biological criterion:

1. Adults in full chorus or 5+ mated pairs;
2. Egg masses of any number;
3. Amphibian larva of any number; or
4. Metamorphosing juveniles still in pool with tail remnants.

To meet the vernal pool biological criterion with the Facultative Species Method, there must also be evidence that there are no reproducing fish populations in the pool. Evidence can include observation of the pool drying out. Facultative species often cohabitate with fish; therefore, it cannot be assumed that there are no fish present in the pool if facultative species are observed. Unlike obligate species, the presence of facultative species provides no evidence of ephemeral or semi-permanent hydrology. In addition, the pool can have no permanently flowing outlet.

#### 4.3.1.2 Proposed Activities to Identify Potential Vernal Pools in Reach 5A

The identification of potential vernal pools in Reach 5A will begin by compiling historical information on areas that may constitute vernal pools. As part of EPA's Housatonic River Ecological Characterization efforts that occurred primarily between 1998 and 2002, detailed surveys were conducted to document the occurrence of potential vernal pools (i.e., spring breeding habitats by various herptiles) between the Confluence and Woods Pond (TechLaw 1998, as referenced in Appendix A.18 to EPA's *Supplemental Investigation Work Plan for the Lower Housatonic River* [EPA 2000]; Woodlot 2002). During these surveys, 68 potential breeding areas were identified and NHESP Vernal Pool Data Sheets, defining the site conditions and species use, were filled out for each area.<sup>19</sup> Of the 68 breeding habitat areas identified during the Ecological Characterization efforts (referred to as potential vernal pools), 35 are located within Reach 5A. Each of these will be assessed during the current effort, using both existing data and updated field survey information. In addition to these 35 potential vernal pools, other potential amphibian breeding/vernal pool habitat areas identified by aerial photographs or during previous or current field surveys (e.g., Example Area surveys in 2009 [discussed in GE 2010]) will be incorporated into the current assessment.

The initial efforts will involve compilation of the data generated during the 1998-1999 field surveys and reviewing the Vernal Pool Data Sheets and other information available from those efforts and associated reports and mapping products. Review of aerial photographs from various available dates over the past 20 years will be conducted to identify potential ponded areas that may support vernal pool and amphibian breeding habitat conditions. These existing data and other available information (e.g., Example Area surveys) on each of the potential pool locations and conditions will be consolidated to summarize conditions of each area.

During the vernal pool breeding season, generally between late March and early June (but most likely between April and May), all 35 potential vernal pools previously identified in Reach 5A and all other potential vernal pool/amphibian breeding areas identified in that reach via review of aerial photographs or prior field surveys will be visited in the field, and investigations will be conducted to determine whether those areas meet the biological and physical criteria described above for NHESP certification. It is anticipated that each area will be surveyed at least twice during the primary vernal pool breeding period, consistent with the seasonal conditions observed for that particular year.<sup>20</sup> The current version of the NHESP Vernal Pool Field Observation Form (provided in Appendix A) will be completed for each discrete area identified and surveyed.

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<sup>19</sup> These investigators noted that not all pools met the definition of a vernal pool as defined by Kenney (1995).

<sup>20</sup> Marbled salamanders breed during late summer and deposit eggs in dried wetland basins. However, there are no reports of this species occurring in the Rest of River area, and, therefore, late summer/fall surveys for this species are not considered warranted.

While these surveys are intended to address the biological criteria encompassed in the NHESP guidelines, additional field visits will be required to assess the physical criteria (e.g., whether there is a “permanently flowing outlet” and/or reproducing fish population) for pools that meet the biological criteria. This assessment will require monitoring the hydrology in each such pool, assessing the presence or absence of fish, and establishing the hydrologic connectivity with the Housatonic River or tributary streams, primarily in terms of the annual duration of a surface water connection. In general, the critical time period for assessing this hydrologic connection is during the months of July through September. In performing this assessment for pools that meet the biological criteria, the relative meteorological/hydrological conditions during the monitoring period versus the long-term average conditions will be considered (i.e., whether conditions are relatively dry or wet).

The limits of each identified potential pool will also need to be delineated based upon a combination of biological, hydrological, and topographic conditions. During the site investigations to survey for the biological criteria (April to May), the contiguous flooded extent of any area identified with breeding obligate amphibians and/or fairy shrimp will be delineated and the limits located via DGPS. In cases where the floodplain limits are not within a discrete, well-defined basin, a judgment will be made at the time on the limits of the contiguous flooded conditions that appear suitable for supporting such biological activity as characterizing a vernal pool.

The consolidated and updated information generated for each potential vernal pool area will be summarized in spreadsheet format to summarize the pertinent conditions and data used to apply the criteria contained in the NHESP guidelines. Based upon the available information and data, a determination will be made as to whether each area meets the NHESP criteria for certification as a vernal pool and by which criteria/method, as well as the areal limits of the pools that meet those criteria. For areas that do not meet the criteria for certification as a vernal pool, an assessment will be provided as to whether each such area should be classified as backwater or floodplain habitat based upon the observed conditions. This information, including the spreadsheet and the completed NHESP Vernal Pool Field Observation Forms for all areas evaluated, will be submitted to EPA. As noted above and provided in the Modified Permit, EPA will make the final determination as to which areas constitute vernal pools.

#### *4.3.2 Survey to Support Future Calculation of Exposure Point Concentrations and Delineation of Floodplain Remediation Areas*

Condition 5.b of EPA’s conditional approval letter for the Initial SOW (EPA 2017b) states: “The Pre-Design Investigation Work Plan shall propose a method to delineate all other features necessary to calculate floodplain exposure point concentrations.” As described in Section 3.2, PCB data were interpolated spatially over the entire floodplain using Thiessen polygons together with the EPA-derived super habitats developed using the Woodlot (2002) habitat survey. It is unlikely that the

habitats of the Reach 5A floodplain have changed considerably since that survey was completed; therefore, the Woodlot (2002) survey will continue to be used as the presumptive basis of the super habitats used to interpolate the PCB data. However, potential refinements to the borders of difficult access areas—i.e., areas defined by EPA as wadable, difficult, and boatable, which were originally determined by EPA based on the Woodlot (2002) habitat mapping—will be considered if obvious discrepancies are identified in the field. Visual reconnaissance of these difficult access areas will be performed during field survey activities conducted for potential vernal pools (see previous section), and any significant discrepancies will be noted.

Survey activities will also include delineation of the extent of the Frequently Used Subareas because these areas were defined at a relatively coarse spatial resolution in the RCMS (where they were referred to as heavily used subareas). For example, in the RCMS, all trails/paths were defined as approximate 10-foot-wide corridors, while aerial photos were used to define all other types of these areas. For each of the Frequently Used Subareas in Reach 5A, the actual extent of the area that appears to be frequently used will be identified by visual observations (e.g., hiking/biking trails with either disturbed or absent vegetation) and will be surveyed using traditional survey equipment or DGPS.

In addition to the survey work described above, additional survey activities may be required to support remedial design in areas requiring remediation. However, this survey work will not be completed until remediation areas have been identified/delineated following completion of PDI soil PCB sampling, submission of Floodplain PDI Summary Report(s), and subsequent remedial design/remedial action evaluations.

## 5 Data Management

Data management procedures for both field and laboratory data will be specified in detail in the Rest of River FSP/QAPP (in development). An electronic data management system (DMS) will be used to facilitate the storage, retrieval, analysis, and reporting of field and chemistry data associated with floodplain samples collected during the PDI. The purposes of this data management system are to efficiently store, analyze, and generate reports based on generated data. Data verification and validation procedures will be presented in the Rest of River FSP/QAPP. Analytical laboratories will transmit electronic data deliverables (EDDs) for loading into the DMS.

Applications associated with the DMS will include electronic data entry forms, procedures to upload field data and electronic data packages, and internal logic to provide automated QC checks of these inputs. Data collection applications will be used in the field during sampling events to record observations, generate sample IDs, and create chain-of-custody documents. Automated QC checks will be performed through the use of controlled data entry fields and the valid values checks.

## 6 Schedule and Reporting

GE proposes to initiate the floodplain soil PCB sampling activities described herein within 30 days after receipt of EPA approval of this Floodplain PDI Work Plan, subject to weather constraints and receipt of access permission for a sufficient number of properties to warrant initiation of sampling. If initiation of sampling is delayed beyond that 30-day period, GE will advise EPA and propose an alternative date for the initiation of sampling. In addition, GE proposes that, following EPA approval of this Work Plan, it will initiate the desktop evaluation (i.e., compilation and review of existing information) to identify potential vernal pools that will be subject to field verification. The field investigations of the identified potential vernal pools for application of the biological criteria will be conducted during the first spring (i.e., March 15 to June 1) following EPA approval of this Work Plan, and the additional field visits to assess the physical criteria for those pools meeting the biological criteria will be conducted in the summer (i.e., July to September) following the biological field investigations.

In accordance with Section 3.4.1 of the Initial SOW, a Floodplain PDI Summary Report for Reach 5A will be prepared that summarizes the data collected pursuant to this Floodplain PDI Work Plan and provides an assessment of whether there are any additional or remaining data needs. If the findings of the investigations summarized herein indicate that additional PCB soil sampling or survey work is necessary to further supplement the available data, the Floodplain PDI Summary Report will include a proposal for such supplemental investigations (or a schedule for submitting such a proposal). GE proposes to submit the Floodplain PDI Summary Report for Reach 5A within the later of the following: (a) 90 days following receipt and completion of validation of the analytical results associated with the sampling summarized herein; or (b) 60 days after completion of the field surveys of potential vernal pools as described in Section 4.3.1.2, depending on the relative timing of those activities.

The Floodplain PDI Summary Report for Reach 5A will include the following:

- A summary of the investigations performed and investigation results, including both the sampling activities and the survey activities;
- A summary of validated analytical PCB data and discussion of any QA/QC issues with the data;
- Data validation reports and laboratory data reports;
- Supporting documentation of the PDI activities (e.g., sampling logs, photographs);
- Revised floodplain EPCs for each EA and Frequently Used Subarea (per Condition 6 in EPA's conditional approval letter for the Initial SOW);
- Results of the potential vernal pool surveys, including a spreadsheet and completed NHESP Vernal Pool Field Observation Forms for all areas evaluated, a recommendation as to whether

each such area meets the MassDFW criteria for a vernal pool, and a delineation of the areal limits of each potential vernal pool that meets those criteria; and

- An identification of any remaining data needs and, if necessary, a proposal for additional sampling or other pre-design investigations to satisfy those data needs, or a schedule for such a proposal, for the Reach 5A floodplain.<sup>21</sup>

In the meantime, an electronic data export containing the analytical results received in each month from floodplain soil samples collected under this Floodplain PDI Work Plan will be made available to EPA on a monthly basis as part of the Monthly Progress Reports.

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<sup>21</sup> As previously noted, separate PDI work plans will be submitted in the future to propose PDI activities in the remaining reaches of the floodplain that are subject to investigation under the Modified Permit.



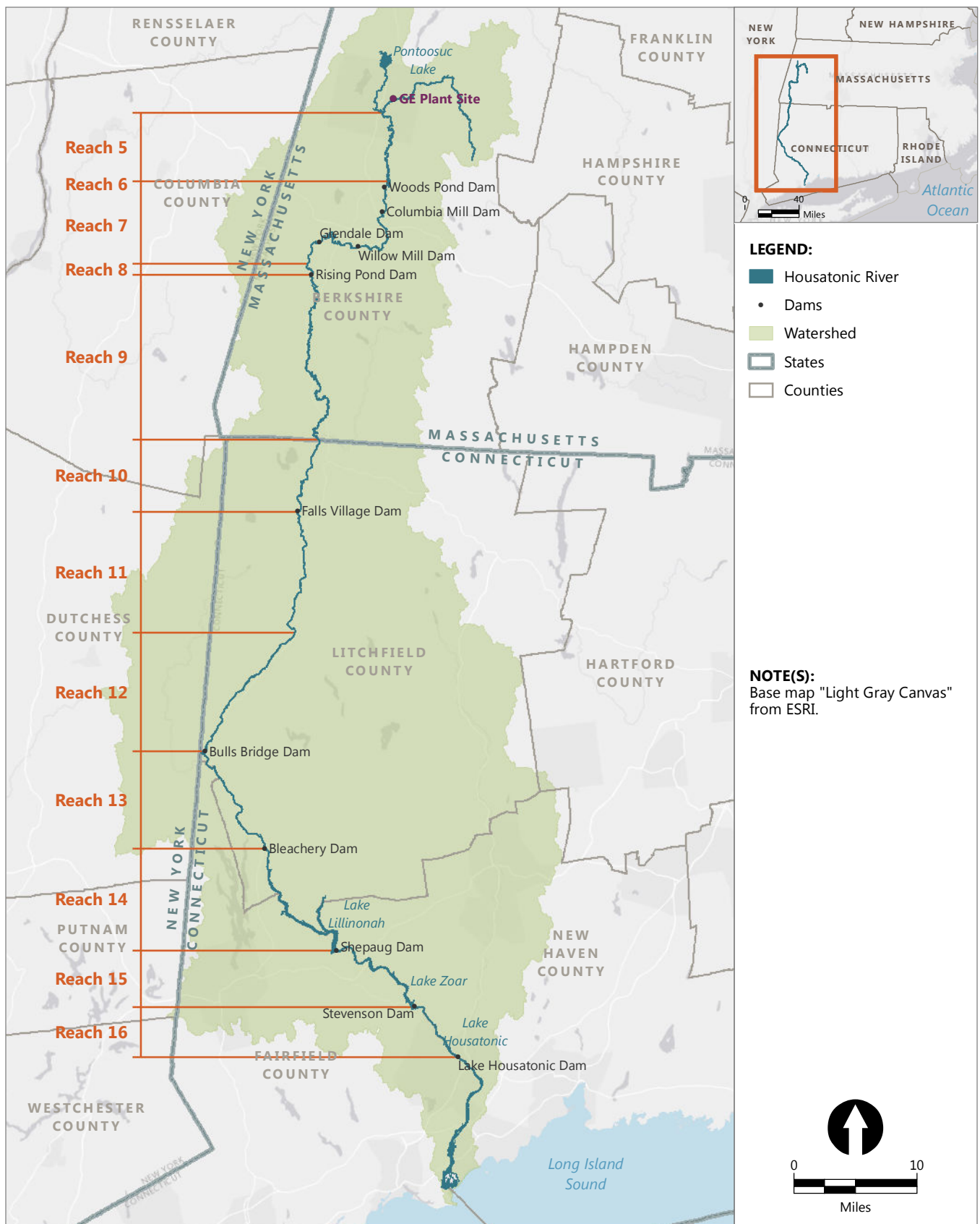
## 7 References

- Anchor QEA (Anchor QEA, LLC), 2016. *Revised Removal Design/Removal Action Work Plan for Floodplain Residential Properties Downstream of the Confluence*. Prepared for General Electric Company, Pittsfield, Massachusetts. September 2016.
- Anchor QEA, 2017. *Housatonic River – Rest of River, Rest of River Initial Statement of Work*. Prepared for General Electric Company, Pittsfield, Massachusetts. May 2017.
- Arcadis, Anchor QEA, and AECOM, 2010. *Housatonic River – Rest of River, Revised Corrective Measures Study Report*. Prepared for General Electric Company, Pittsfield, Massachusetts. October 2010.
- Arcadis BBL and QEA, 2007. *Housatonic River – Rest of River, Corrective Measures Study Proposal*. Prepared for General Electric Company, Pittsfield, Massachusetts. February 2007.
- BBL and QEA, 2003. *Housatonic River – Rest of River, RCRA Facility Investigation Report (RFI Report)*. Prepared for General Electric Company, Pittsfield, Massachusetts. September 2003.
- EPA (U.S. Environmental Protection Agency), 2000. *Supplemental Investigation Work Plan for the Lower Housatonic River*. Prepared by Roy F. Weston, Inc., Manchester, New Hampshire. February 2000.
- EPA, 2002. *Guidance on Choosing a Sampling Design for Environmental Data Collection*. Prepared by U.S. Environmental Protection Agency, Office of Environmental Information, Washington, DC. EPA QA/G-5S. December 2002.
- EPA, 2005. *Human Health Risk Assessment, GE/Housatonic River Site, Rest of River*. Prepared by Weston Solutions, West Chester, Pennsylvania. February 2005.
- EPA, 2006. *Guidance on Systematic Planning Using the Data Quality Objectives Process*. Prepared by U.S. Environmental Protection Agency, Office of Environmental Information, Washington, DC. EPA QA/G-4. February 2006.
- EPA, 2016. Permit Under the Resource Conservation and Recovery Act (RCRA) as Amended, Final Permit Modification to the Reissued RCRA Permit and Selection of CERCLA Remedial Action and Operation & Maintenance for Rest of River (Modified Permit). October 2016.
- EPA, 2017a. Letter to Mr. Andrew Silfer, General Electric Company. Regarding: Notice of Uncontested and Severable Permit Conditions-Revised Notice. January 9, 2017.
- EPA, 2017b. Letter to Mr. Andrew Silfer, General Electric Company. Regarding: Rest of River Initial Statement of Work GE-Pittsfield/Housatonic River Site. July 10, 2017.

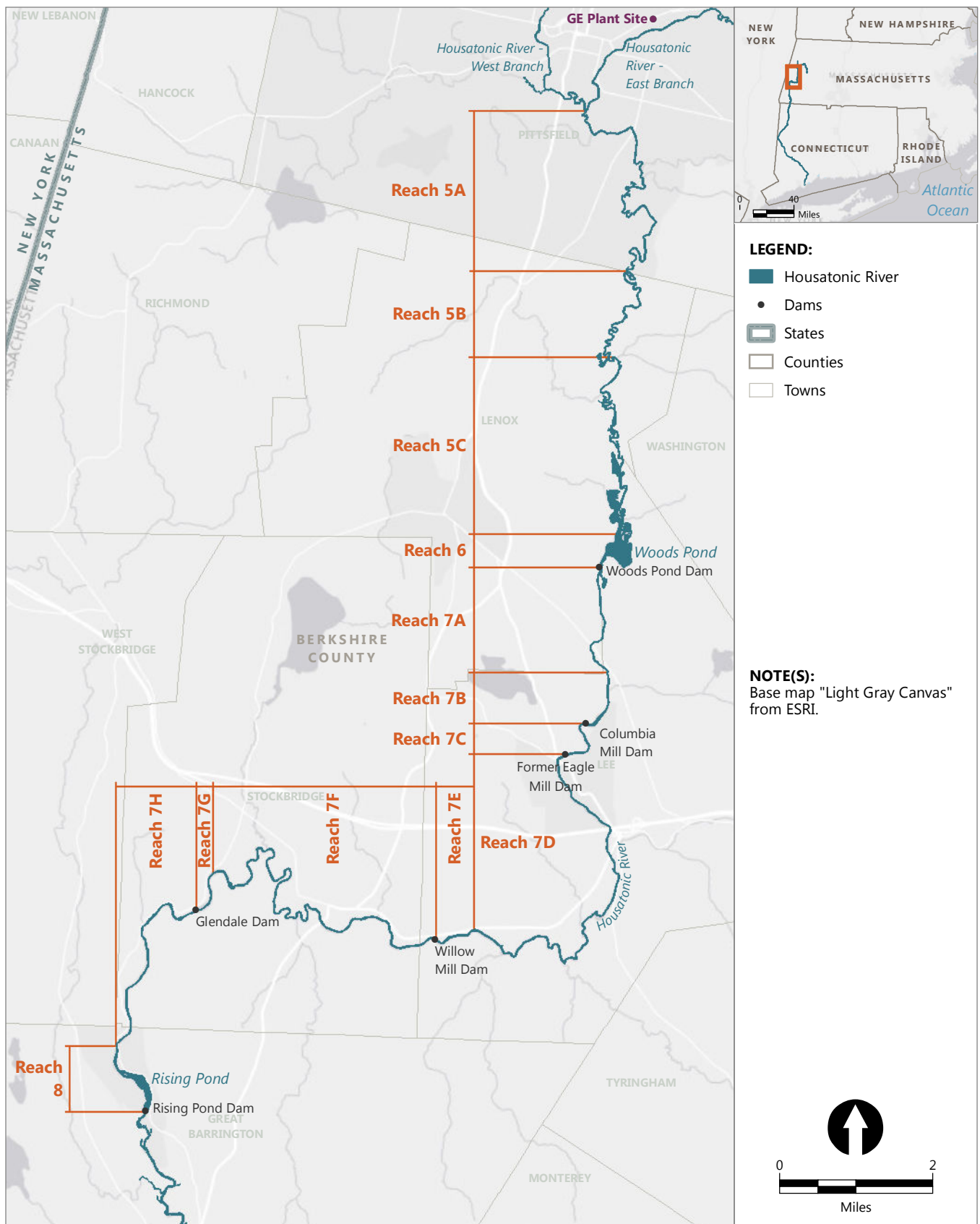
- EPA/GE (General Electric Company), 2000. Consent Decree (CD) in *United States of America, State of Connecticut, and Commonwealth of Massachusetts v. General Electric Company*, Civil Action Nos. 99-30225, 99-30226, 99-30227-MAP, entered by the United States District Court for the District of Massachusetts. October 27, 2000.
- GE, 2010. *Supplement to Response to EPA's Interim Comments on CMS Report: Evaluation of Example Areas* (Supplement to Interim Response). Prepared for General Electric Company, Pittsfield, Massachusetts. February 2010.
- GE, 2017. *Site Health and Safety Plan, GE-Pittsfield/Housatonic River Site – Rest of River*. Prepared by General Electric Company, Pittsfield, Massachusetts. September 2017.
- Kenney, L.P., 1995. *Wicked Big Puddles: A Guide to the Study and Certification of Vernal Pools*. Reading Memorial High School and the Vernal Pool Association.
- MassDFW (Massachusetts Division of Fisheries and Wildlife) NHESP (Natural Heritage and Endangered Species Program), 2009. *Natural Heritage & Endangered Species Program's Guidelines for the Certification of Vernal Pool Habitat*. Massachusetts Division of Fisheries and Wildlife, Natural Heritage & Endangered Species Program. March 2009.
- TechLaw (TechLaw Inc.), 1998. *Preliminary Report, Wetland Characterization and Function Value Assessment, Housatonic River from Newell Street to Woods Pond*. TechLaw Inc., Boston, Massachusetts. 53pp. plus appendices.
- Woodlot (Woodlot Alternatives, Inc.), 2002. *Ecological Characterization of the Housatonic River*. Prepared for U.S. Environmental Protection Agency Region 1, Boston, Massachusetts. September 2002.

## Figures

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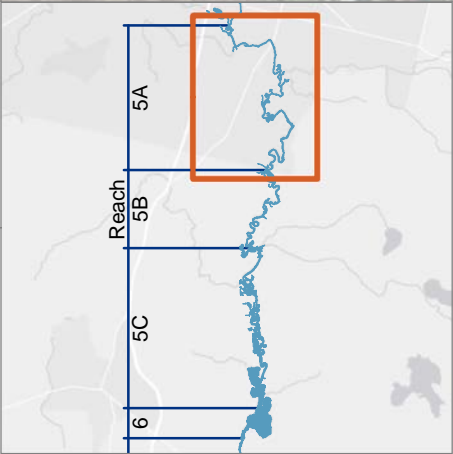
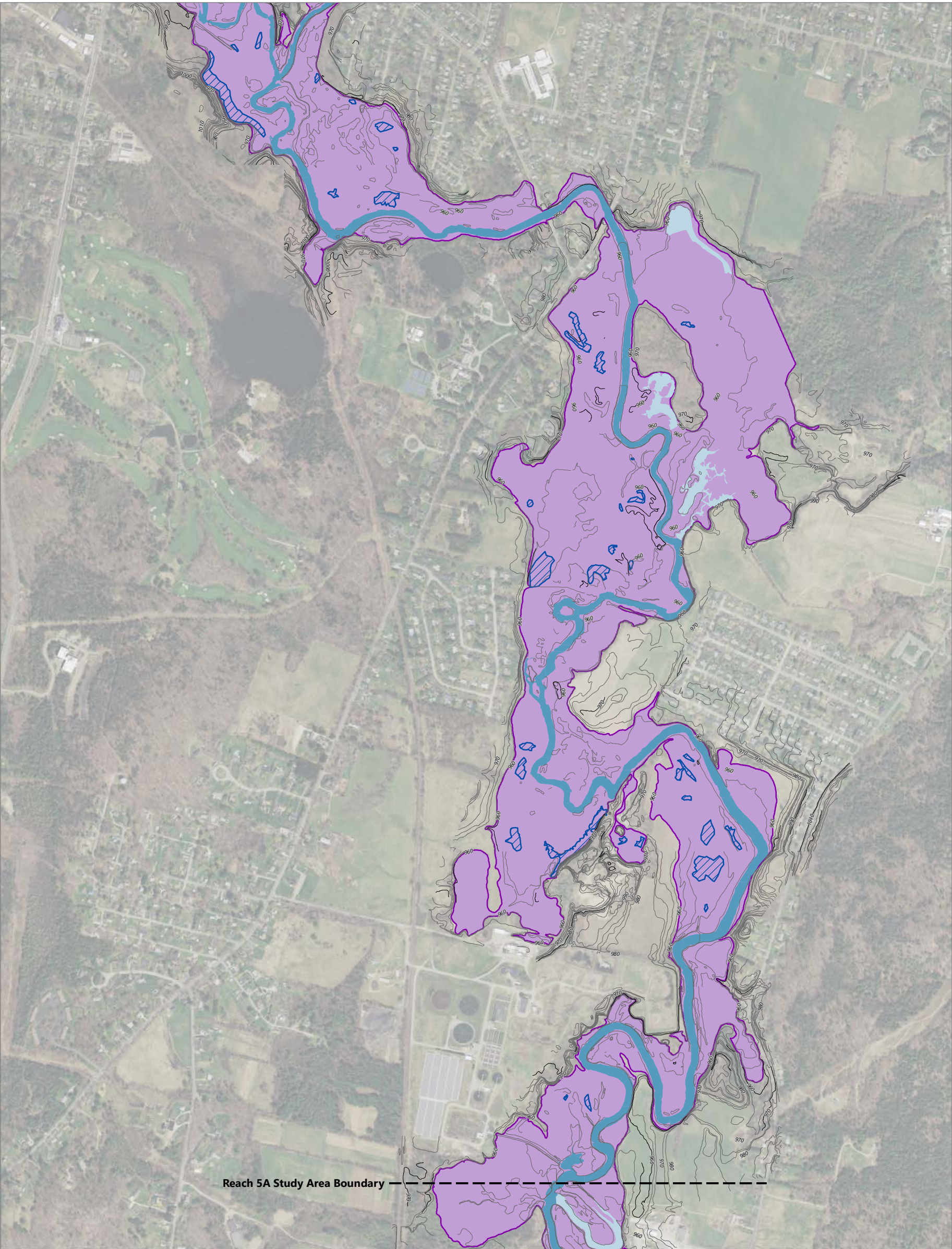


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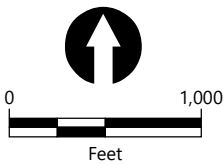


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  - Channel
  - Backwater
  - Vernal Pool

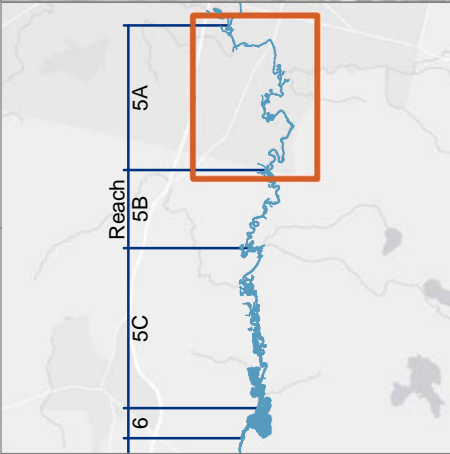
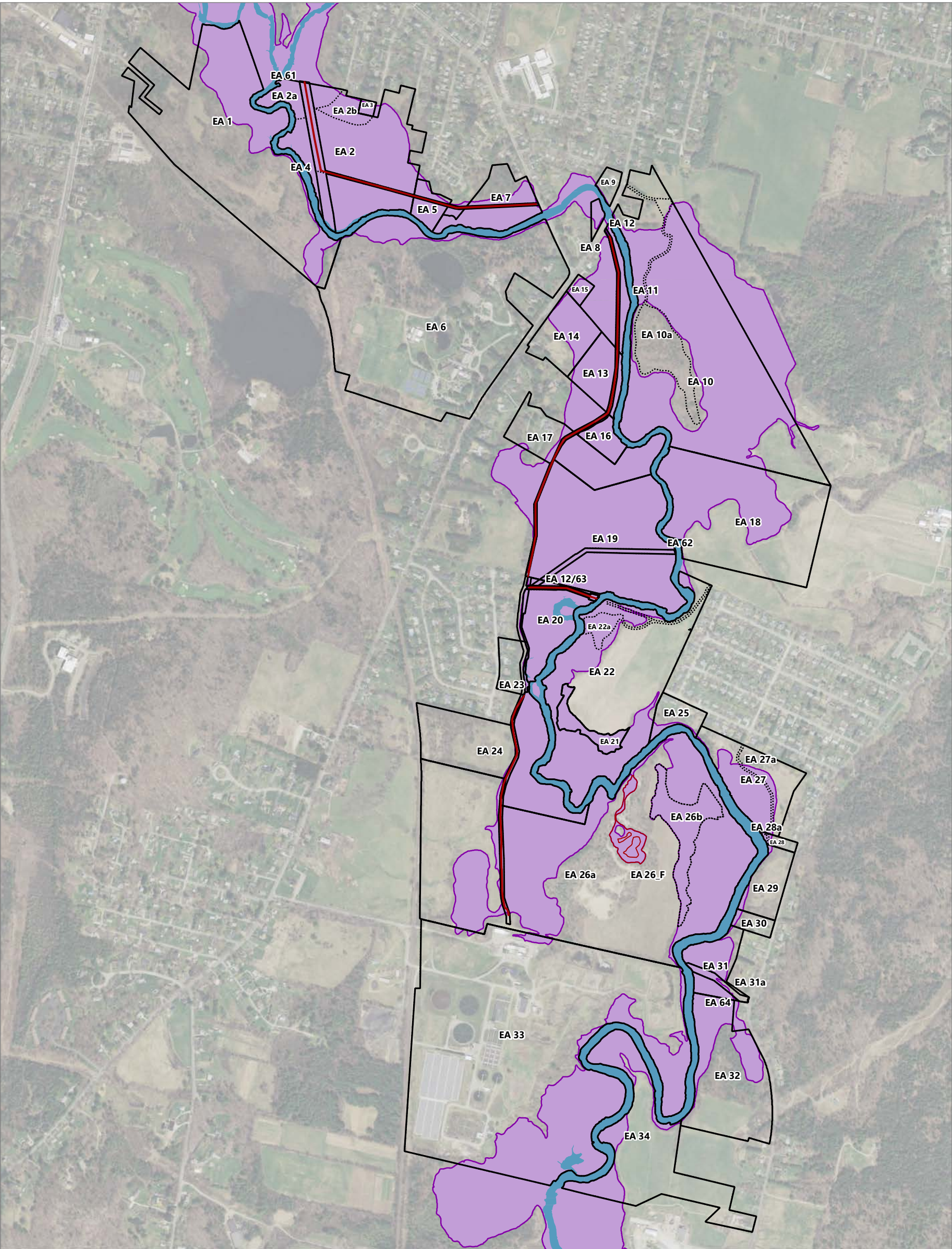


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**Figure 1-3**  
**Hydrography, Floodplain Boundary, and Topography in Reach 5A**  
Floodplain Pre-Design Investigation Work Plan – Reach 5A  
Housatonic River





**LEGEND:**

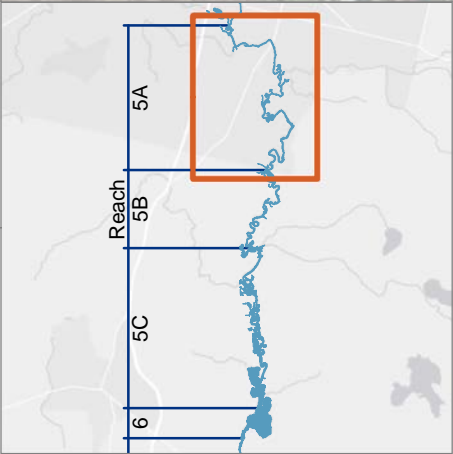
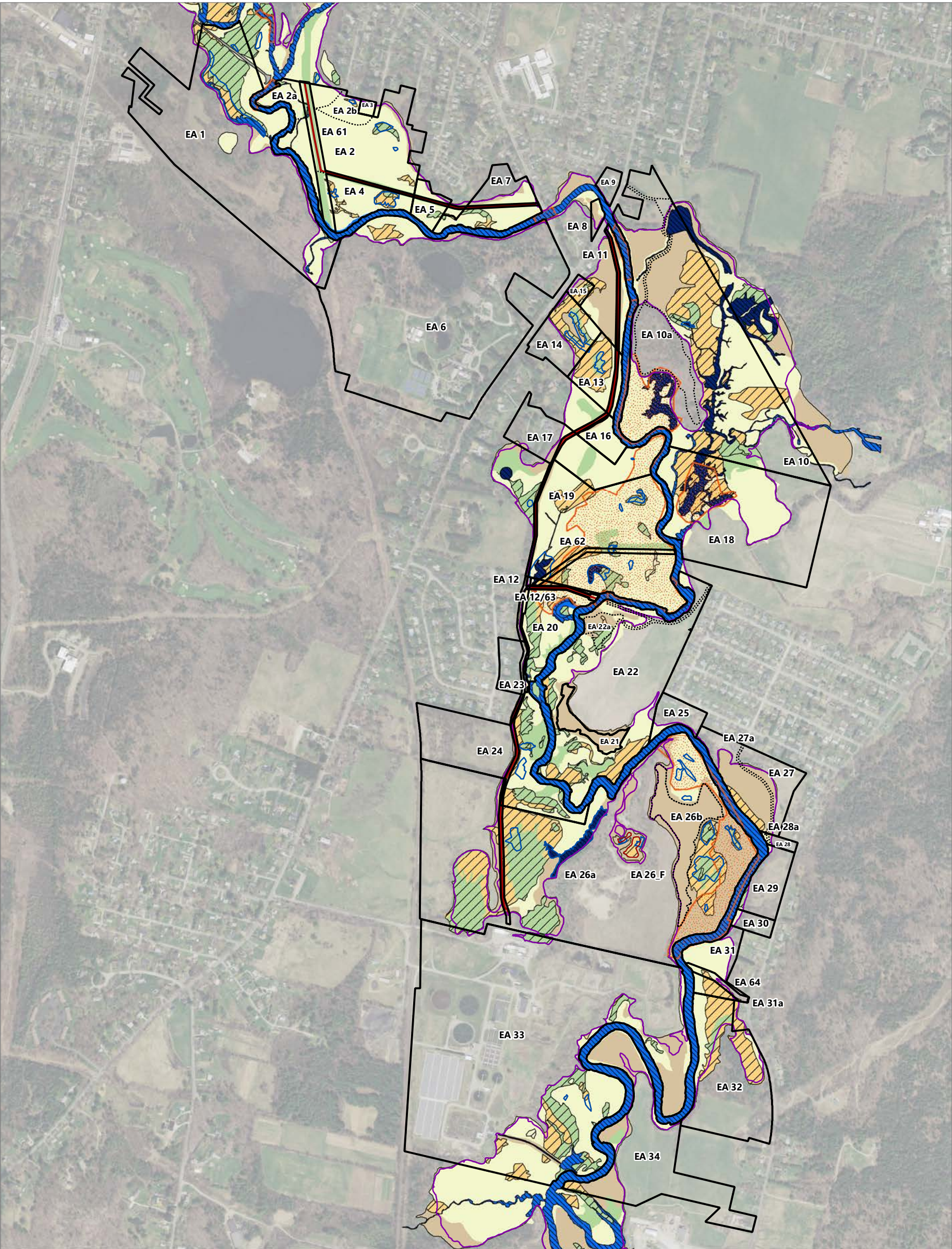
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- Exposure Subarea Boundary
- Frequently Used Subarea
- 1 mg/kg PCB Isopleth
- Channel

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**Figure 3-1**  
**Exposure Area, Subarea, and Frequently Used Subarea Boundaries**  
Floodplain Pre-Design Investigation Work Plan – Reach 5A  
Housatonic River





**LEGEND:**

Exposure Area Boundary

Exposure Subarea Boundary

**Super Habitats**

- Emergent Marsh and Wet Meadow
- Transitional Floodplain Forest
- Hardwood Forest, Agricultural Field
- Shrub Swamp
- Stream
- Lake/Pond

**Habitat Access**

- Boatable (use factor = 0)
- Difficult/Wadable (use factor = 0.2)
- Walkable (use factor = 1.0)

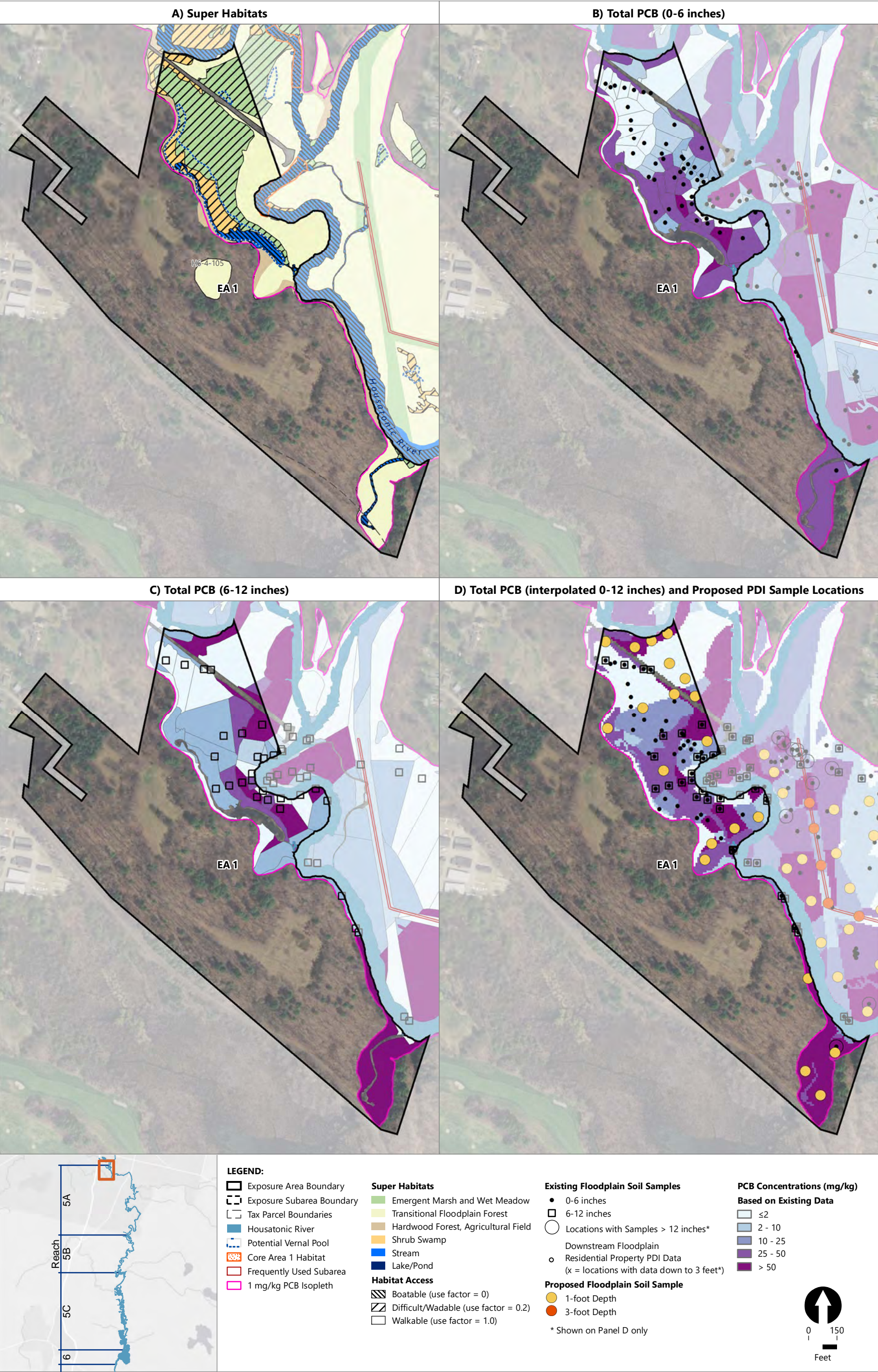
- Core Area 1 Habitat
- Vernal Pool
- Frequently Used Subarea
- 1 mg/kg PCB Isopleth

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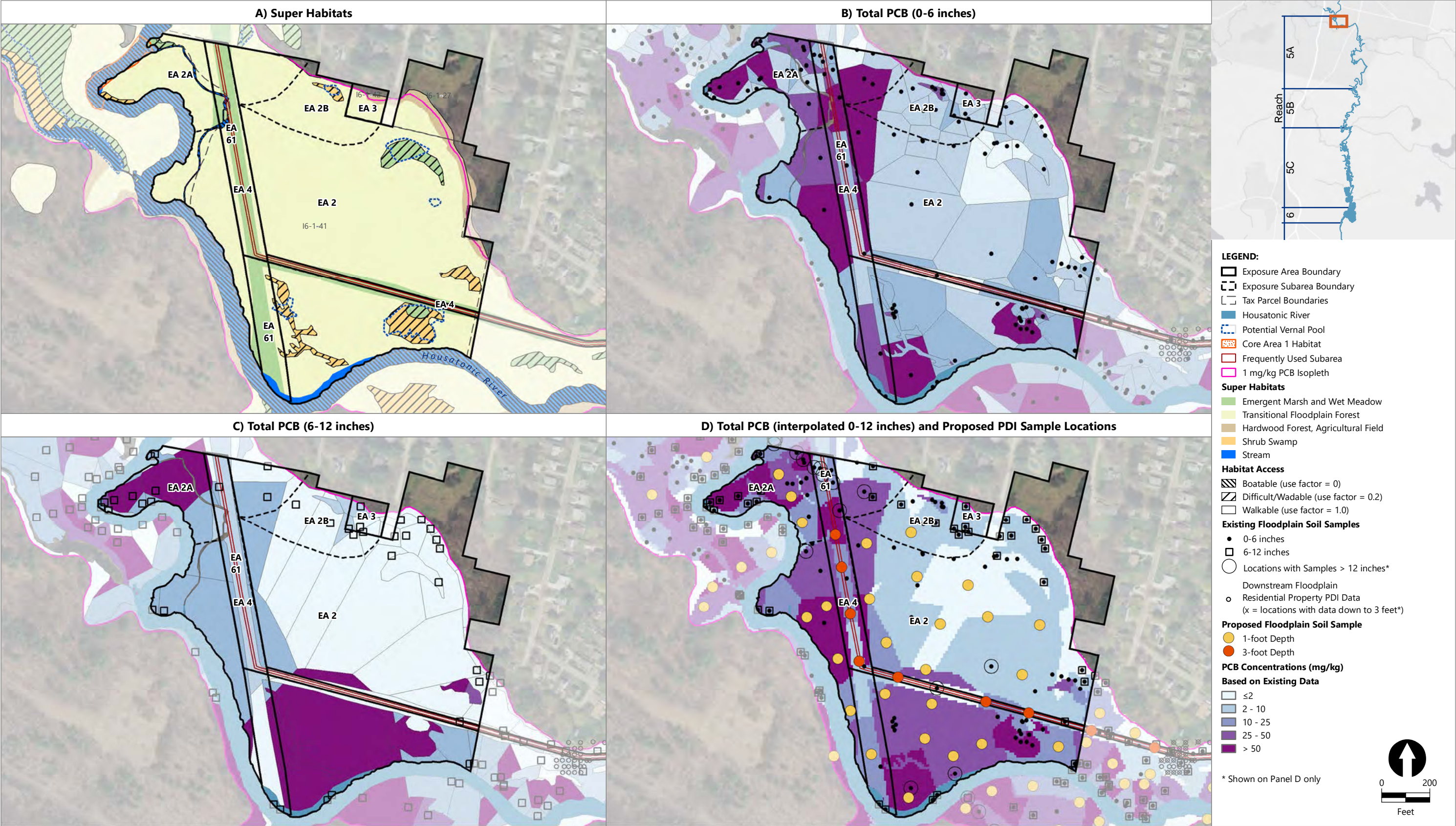


**Figure 3-2**  
**Reach 5A Exposure Areas and Habitat Information Used in Calculating EPCs**  
Floodplain Pre-Design Investigation Work Plan – Reach 5A  
Housatonic River







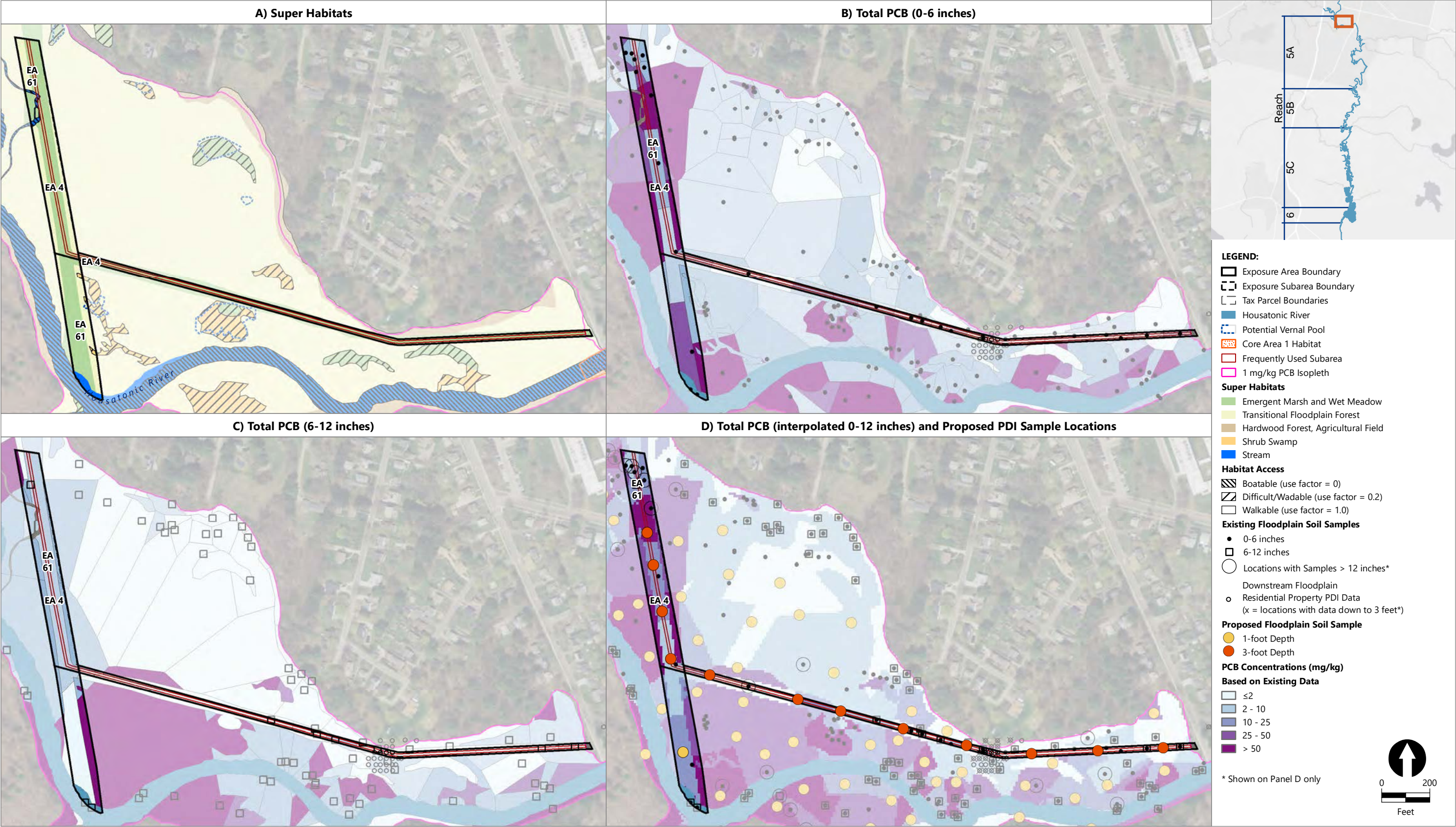


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**Figure 4-2**  
**Exposure Areas 2 and 3**  
Floodplain Pre-Design Investigation Work Plan – Reach 5A  
Housatonic River



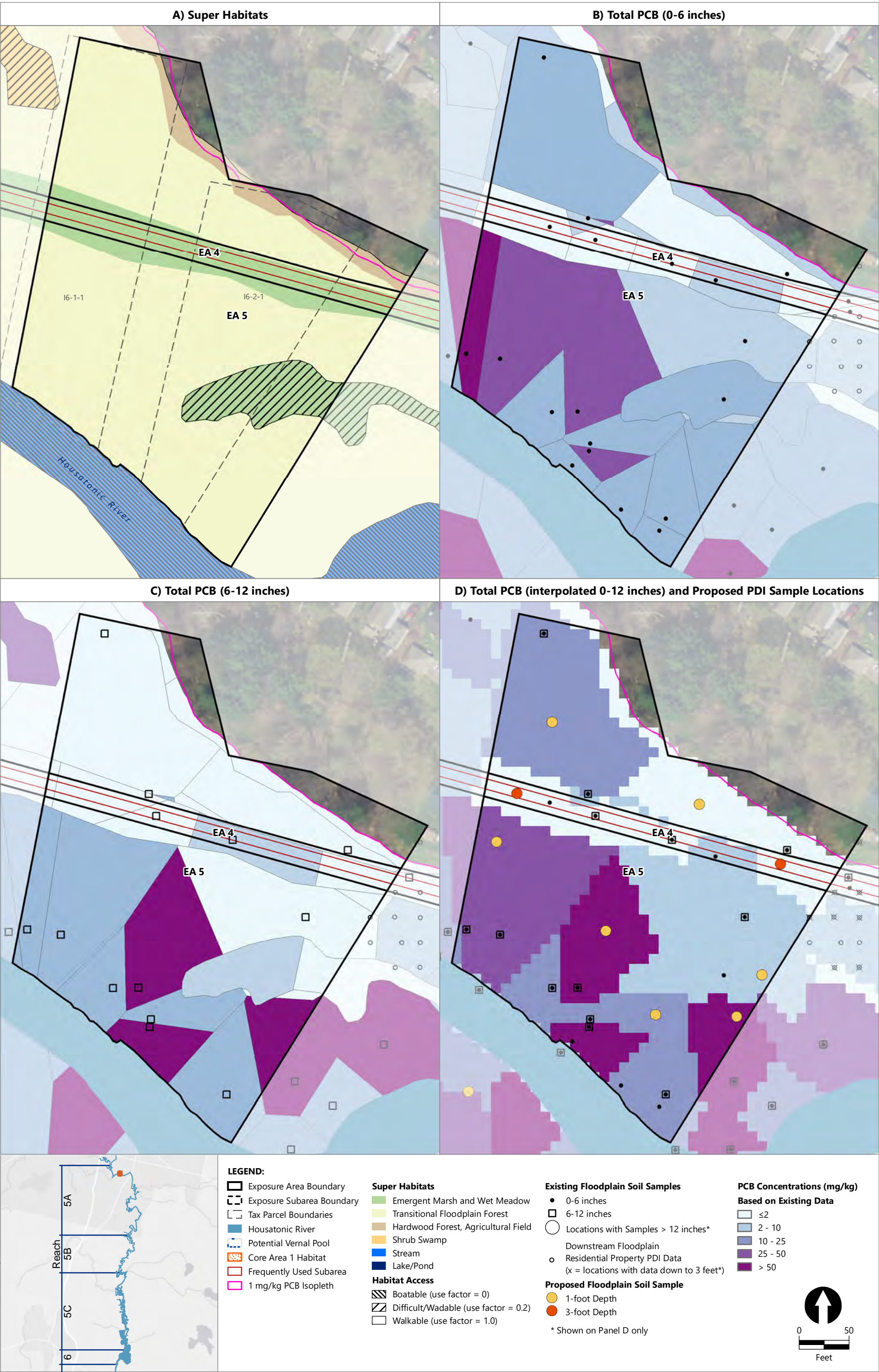


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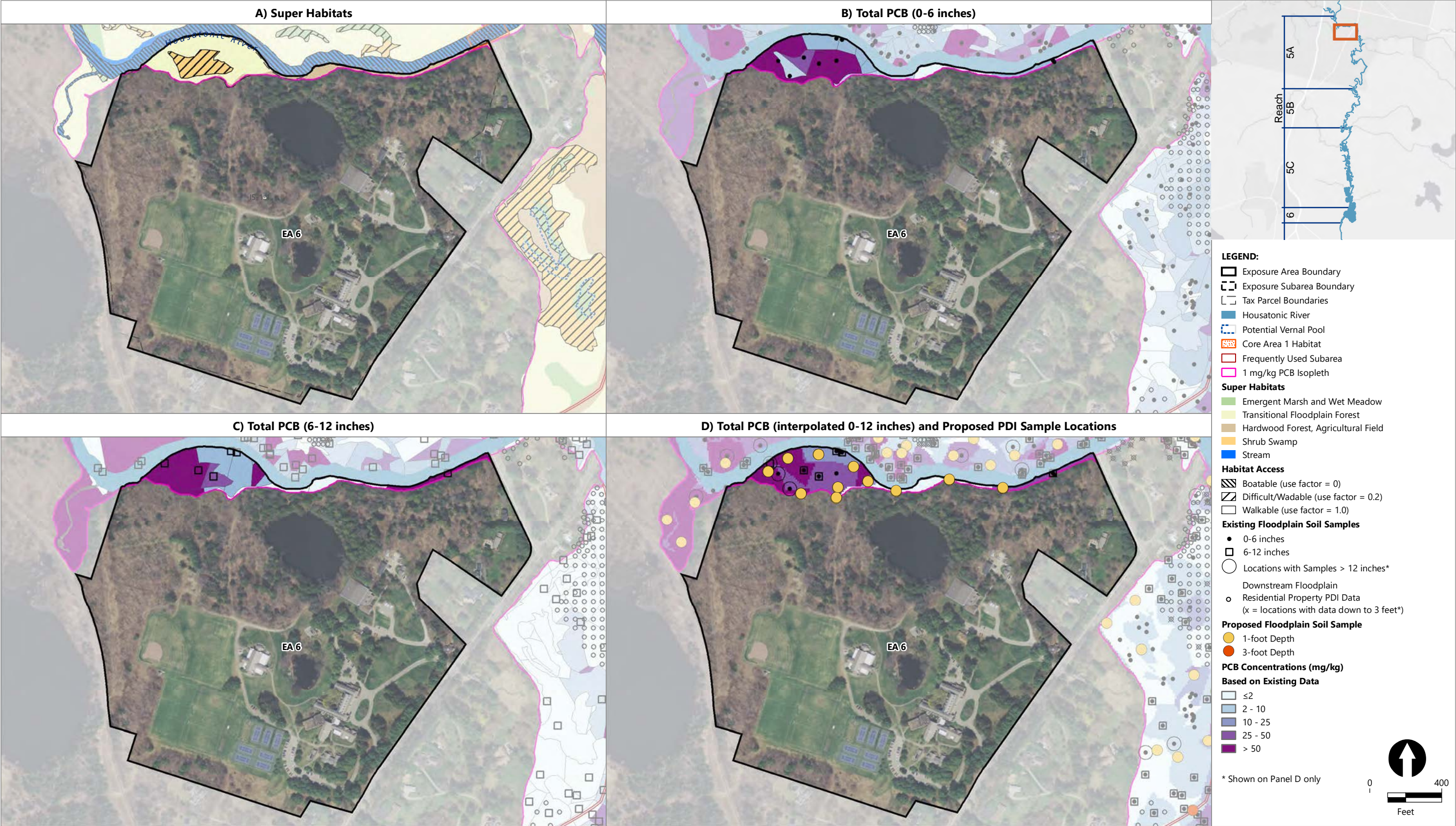


**Figure 4-3**  
**Exposure Areas 4 and 61**  
Floodplain Pre-Design Investigation Work Plan – Reach 5A  
Housatonic River







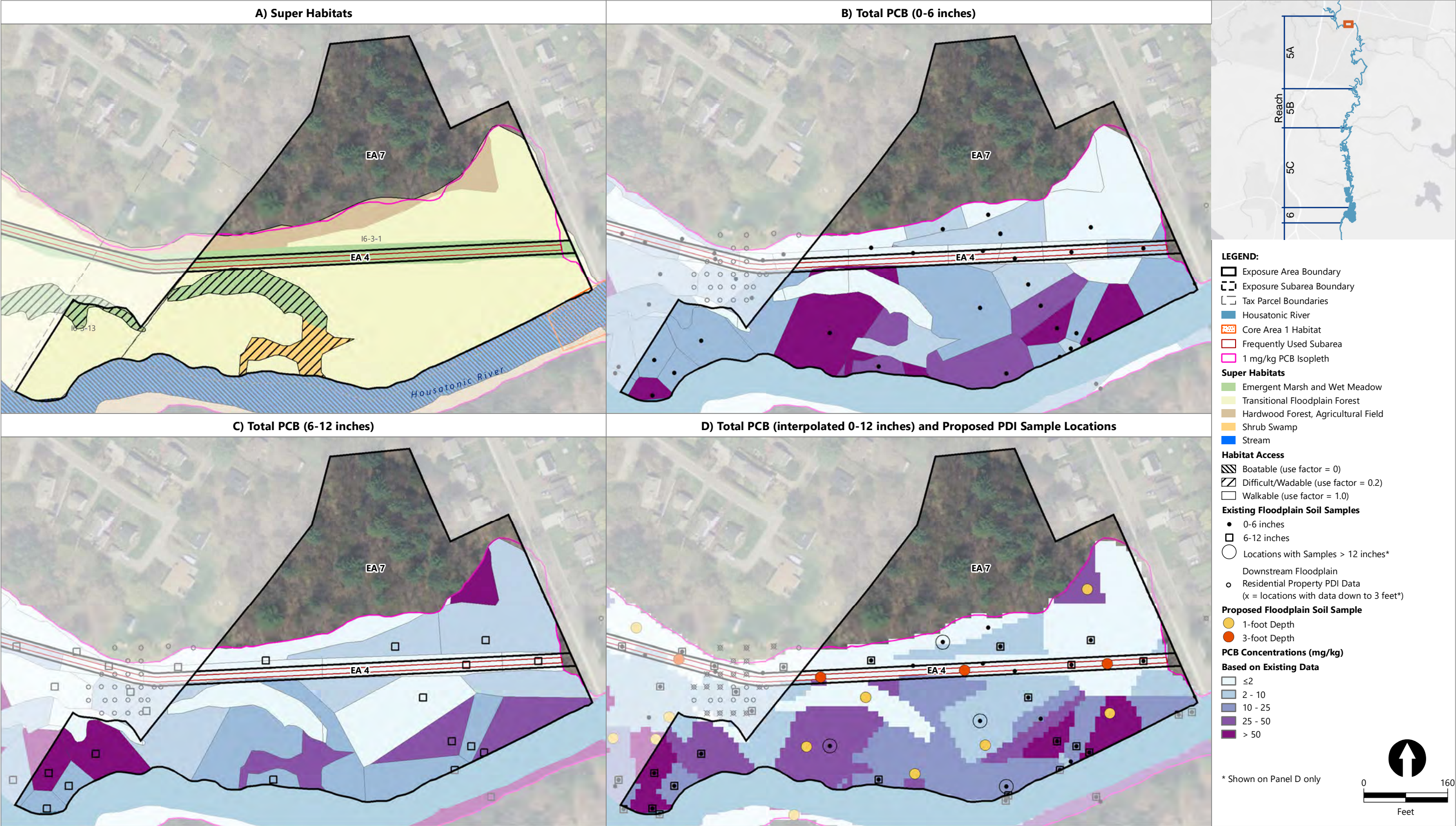


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**Figure 4-5**  
**Exposure Area 6**  
Floodplain Pre-Design Investigation Work Plan – Reach 5A  
Housatonic River



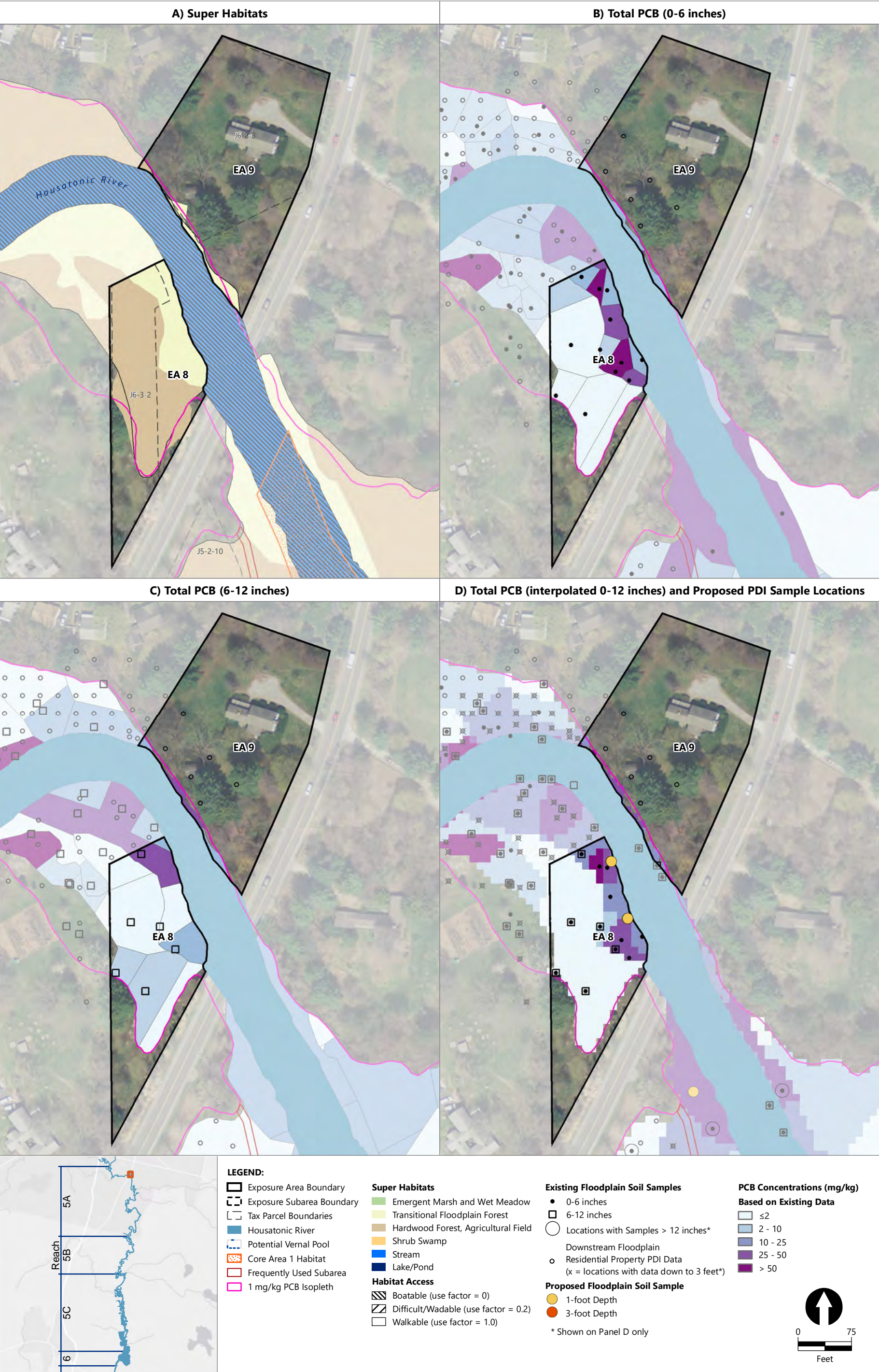


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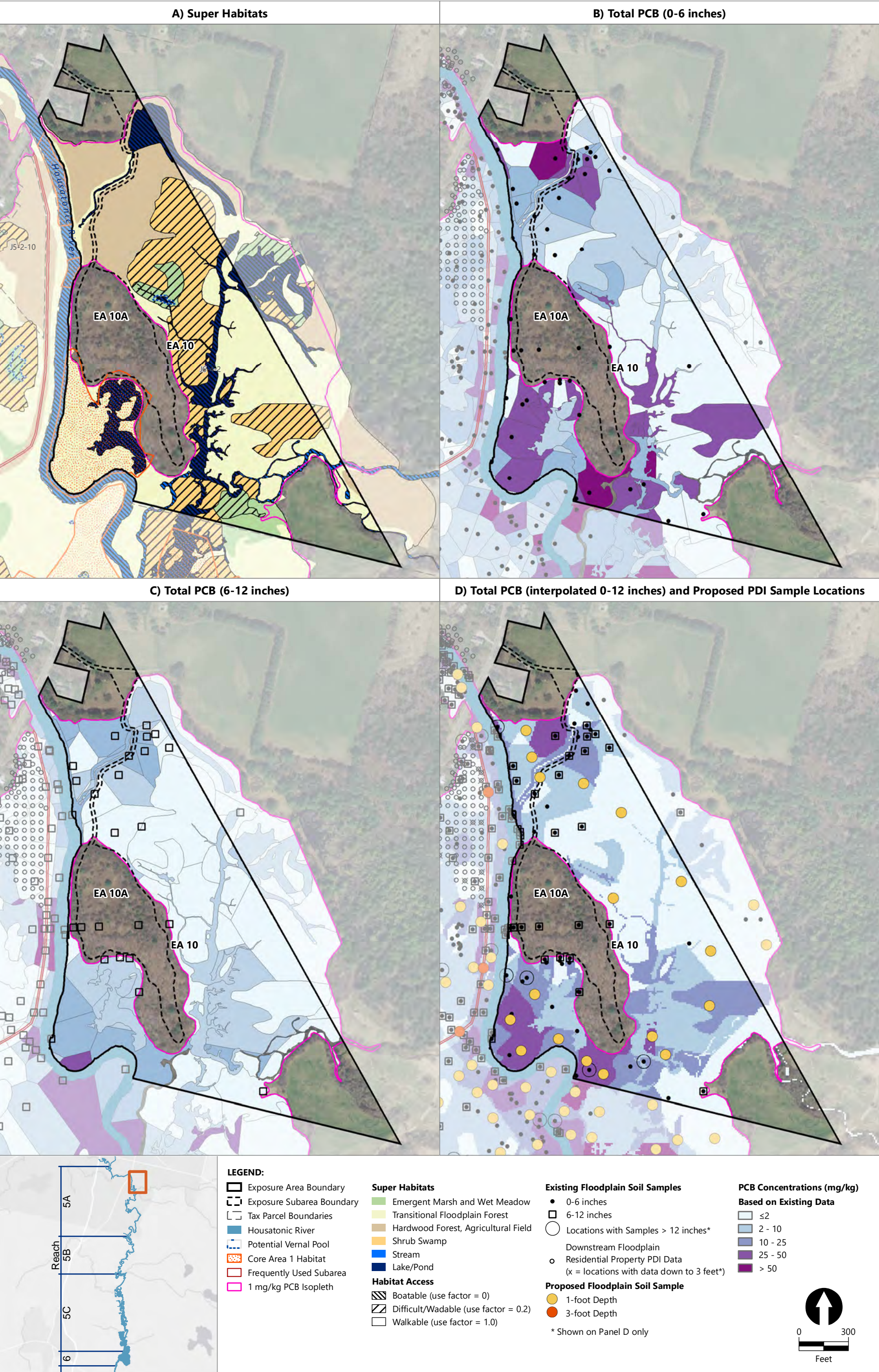


**Figure 4-6**  
**Exposure Area 7**  
Floodplain Pre-Design Investigation Work Plan – Reach 5A  
Housatonic River

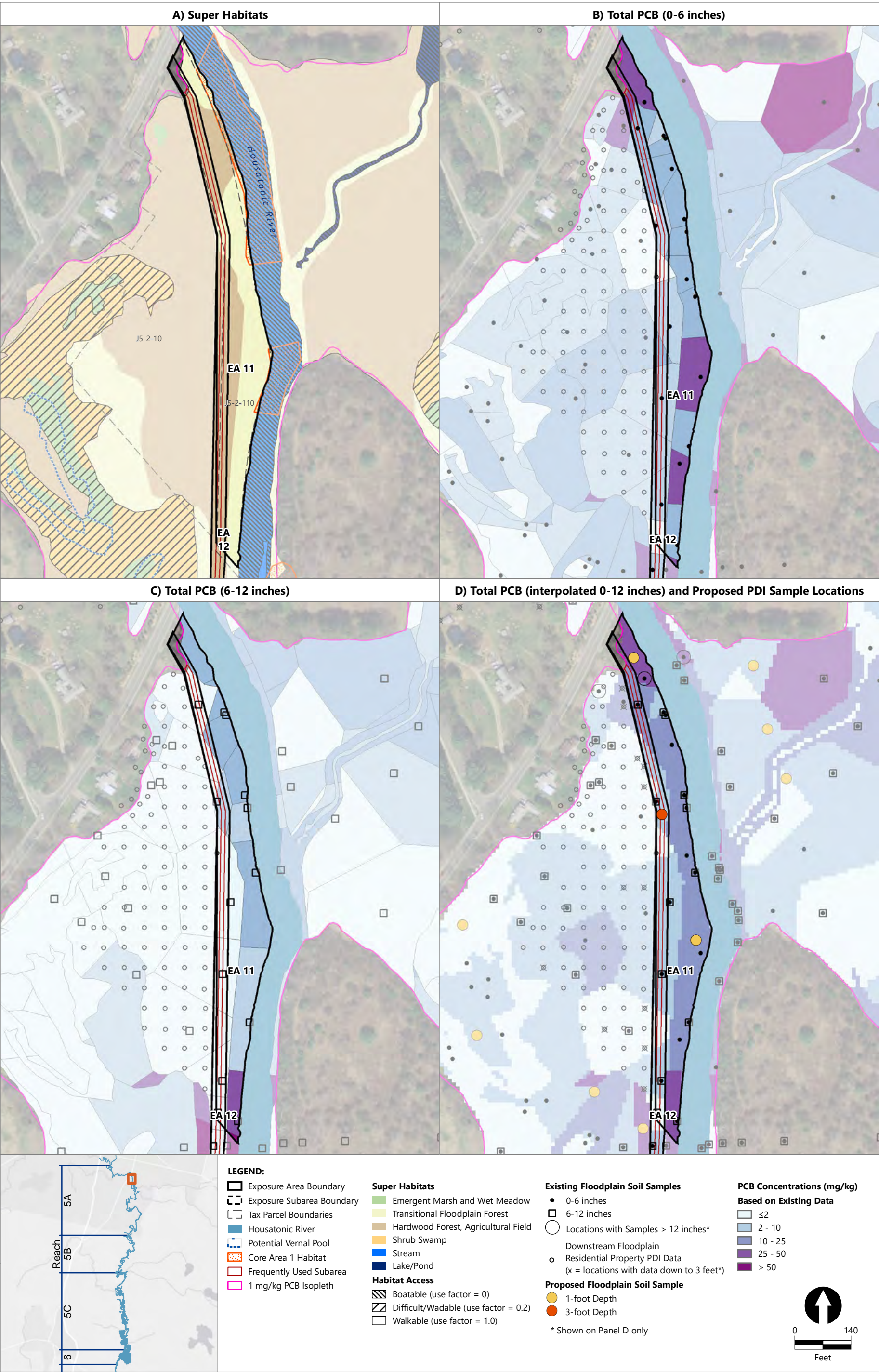








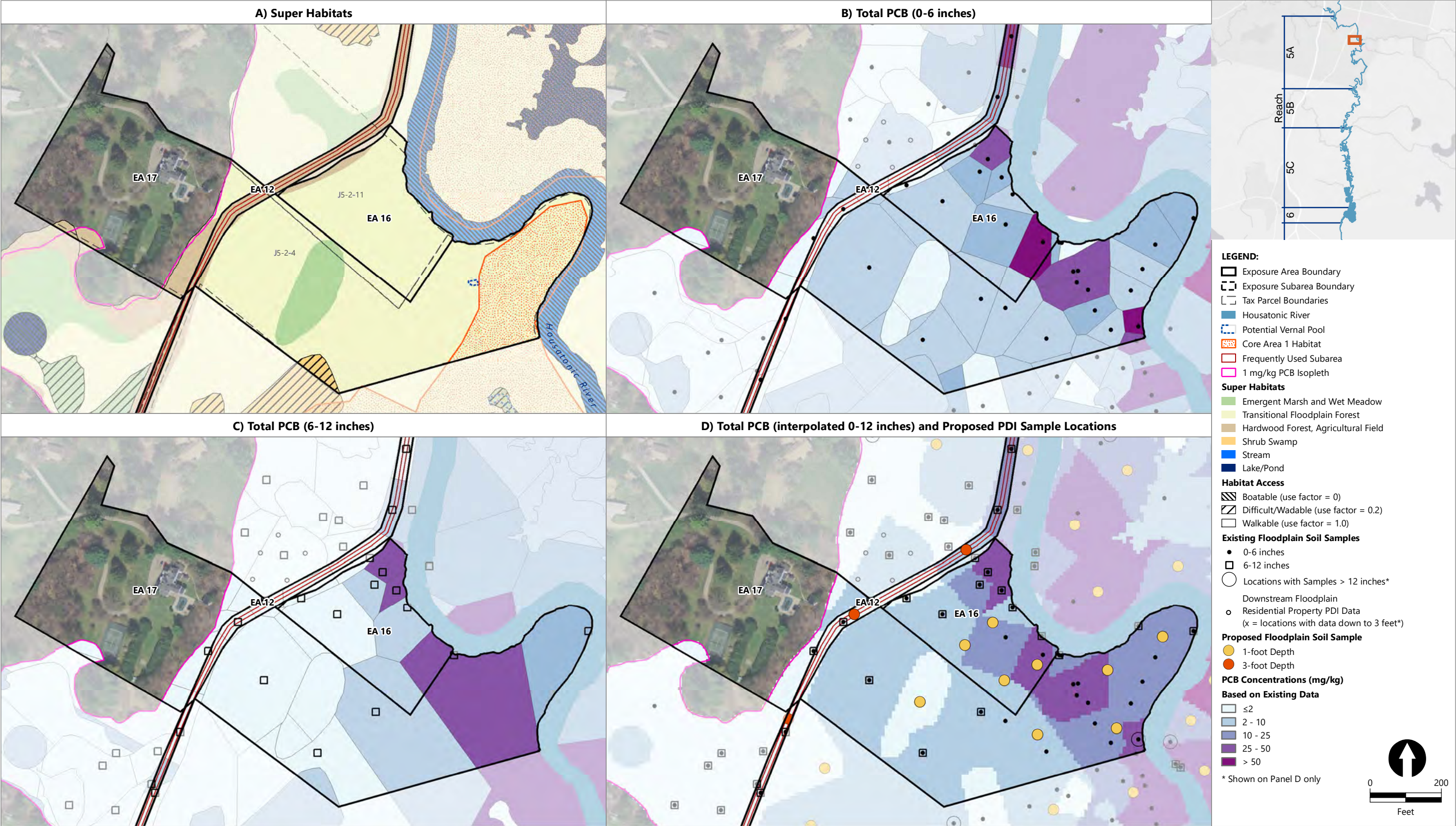










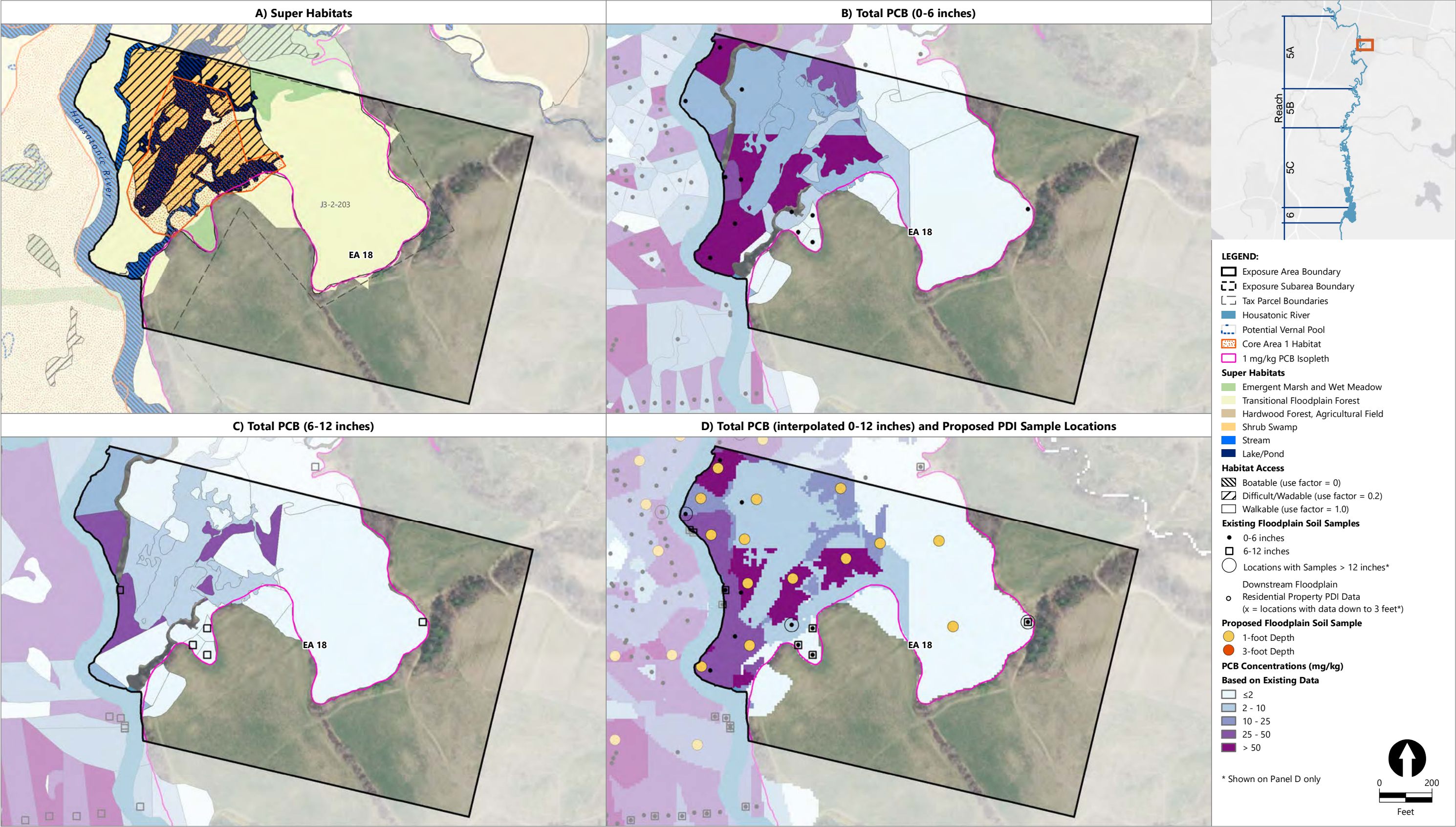


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**Figure 4-11**  
**Exposure Areas 16, 17, and 12 (partial)**  
Floodplain Pre-Design Investigation Work Plan – Reach 5A  
Housatonic River



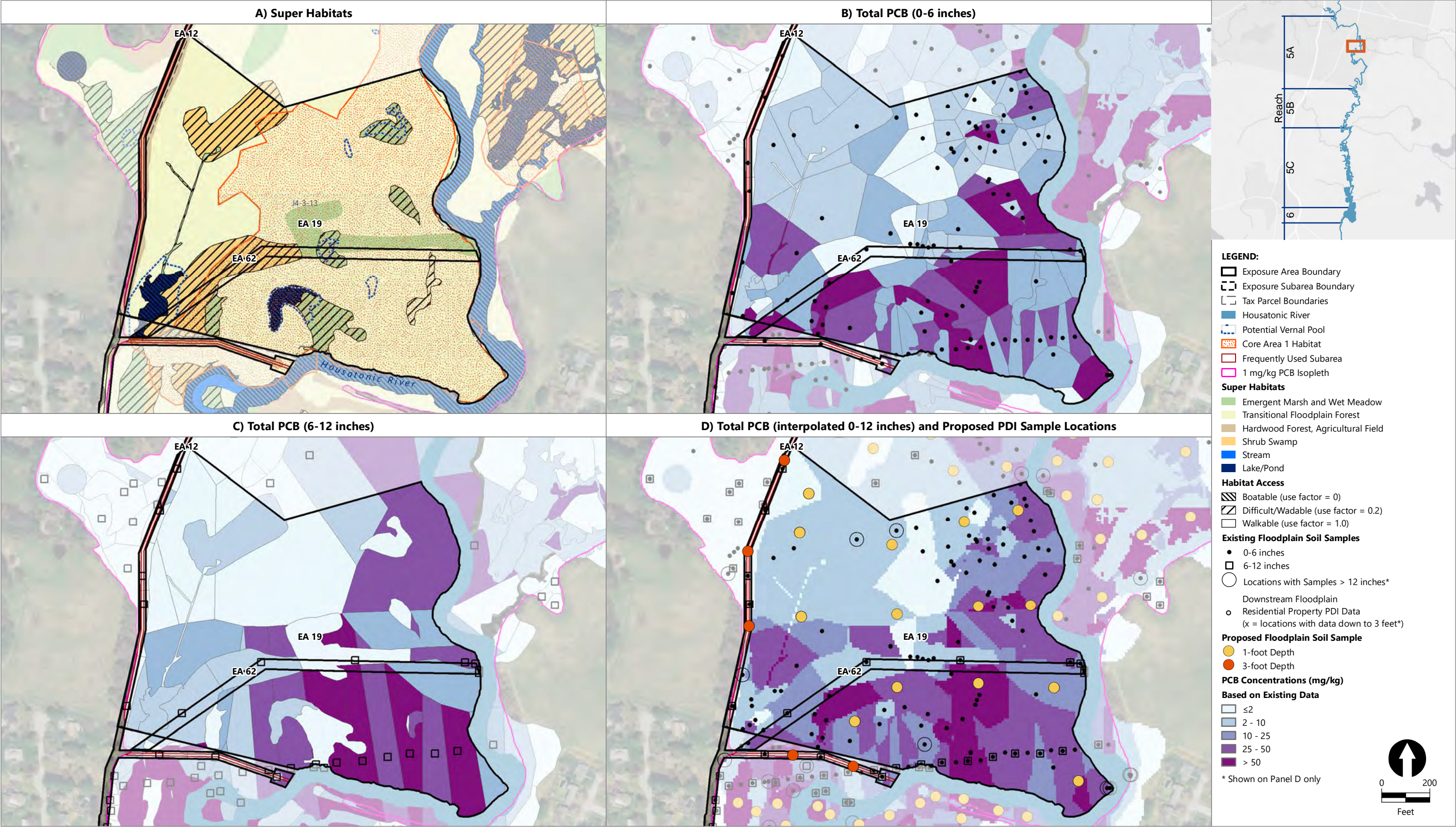


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**Figure 4-12**  
**Exposure Area 18**  
Floodplain Pre-Design Investigation Work Plan – Reach 5A  
Housatonic River



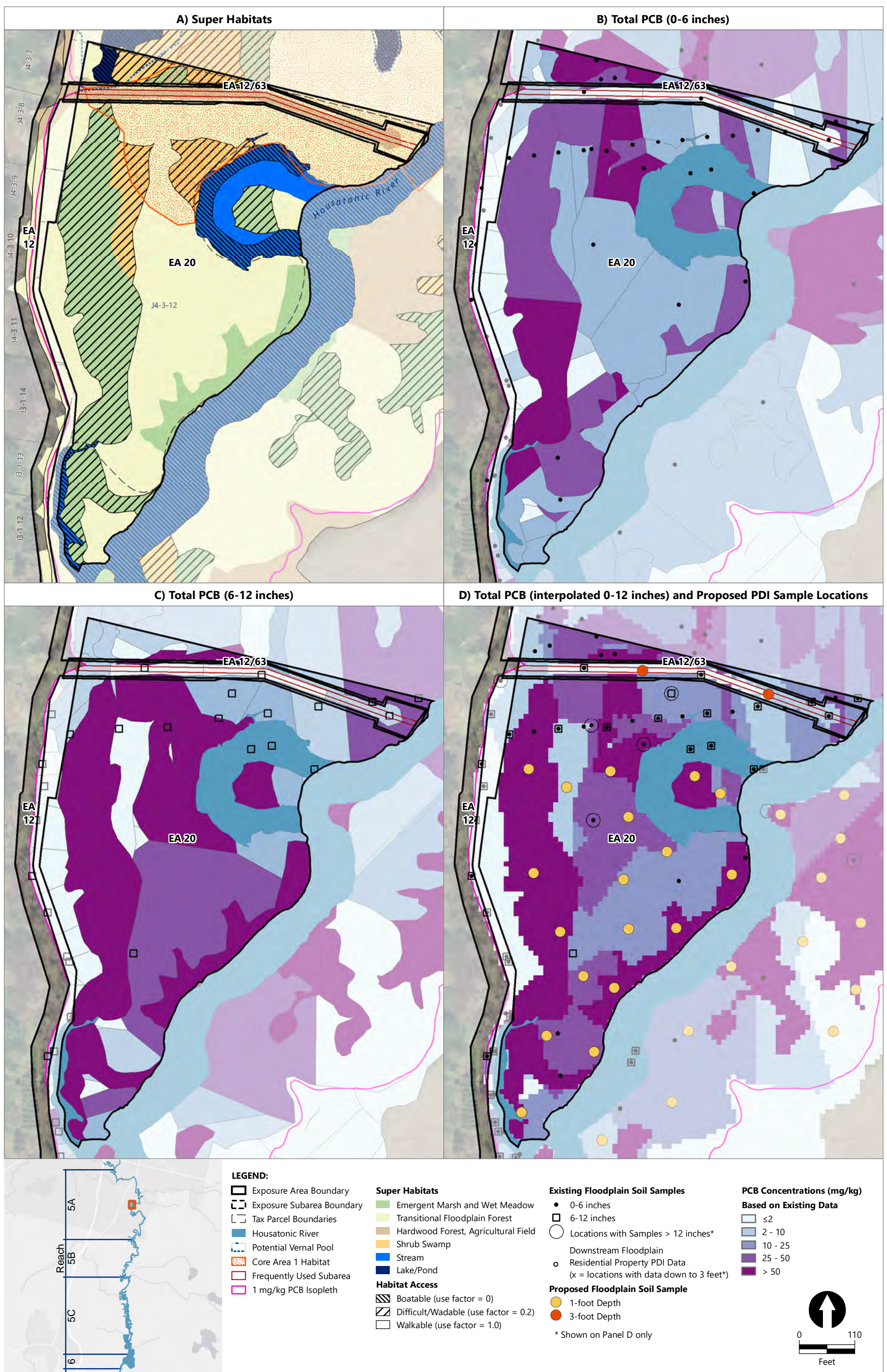


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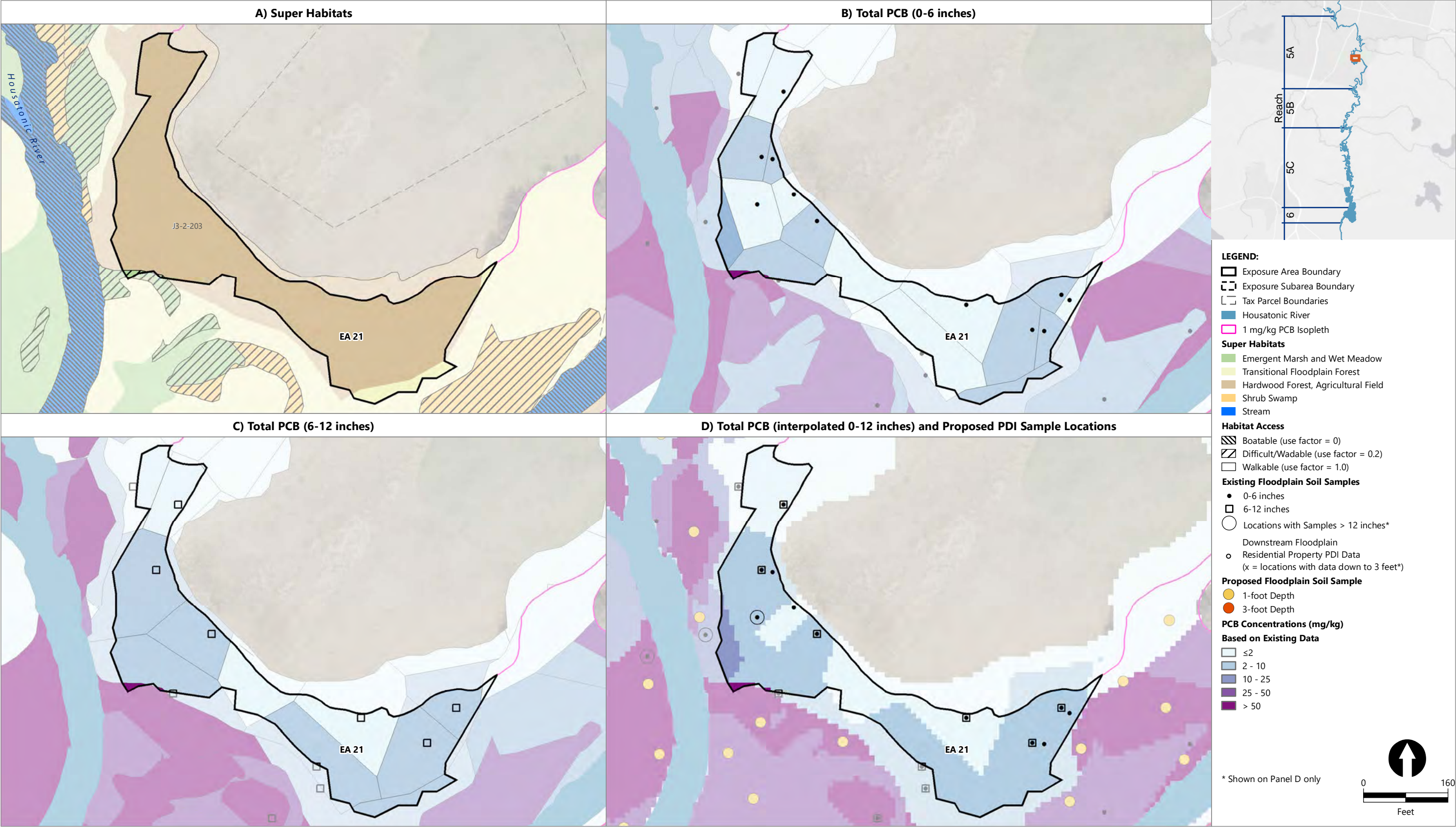


**Figure 4-13**  
**Exposure Areas 19, 62, and 12 (partial)**  
Floodplain Pre-Design Investigation Work Plan – Reach 5A  
Housatonic River



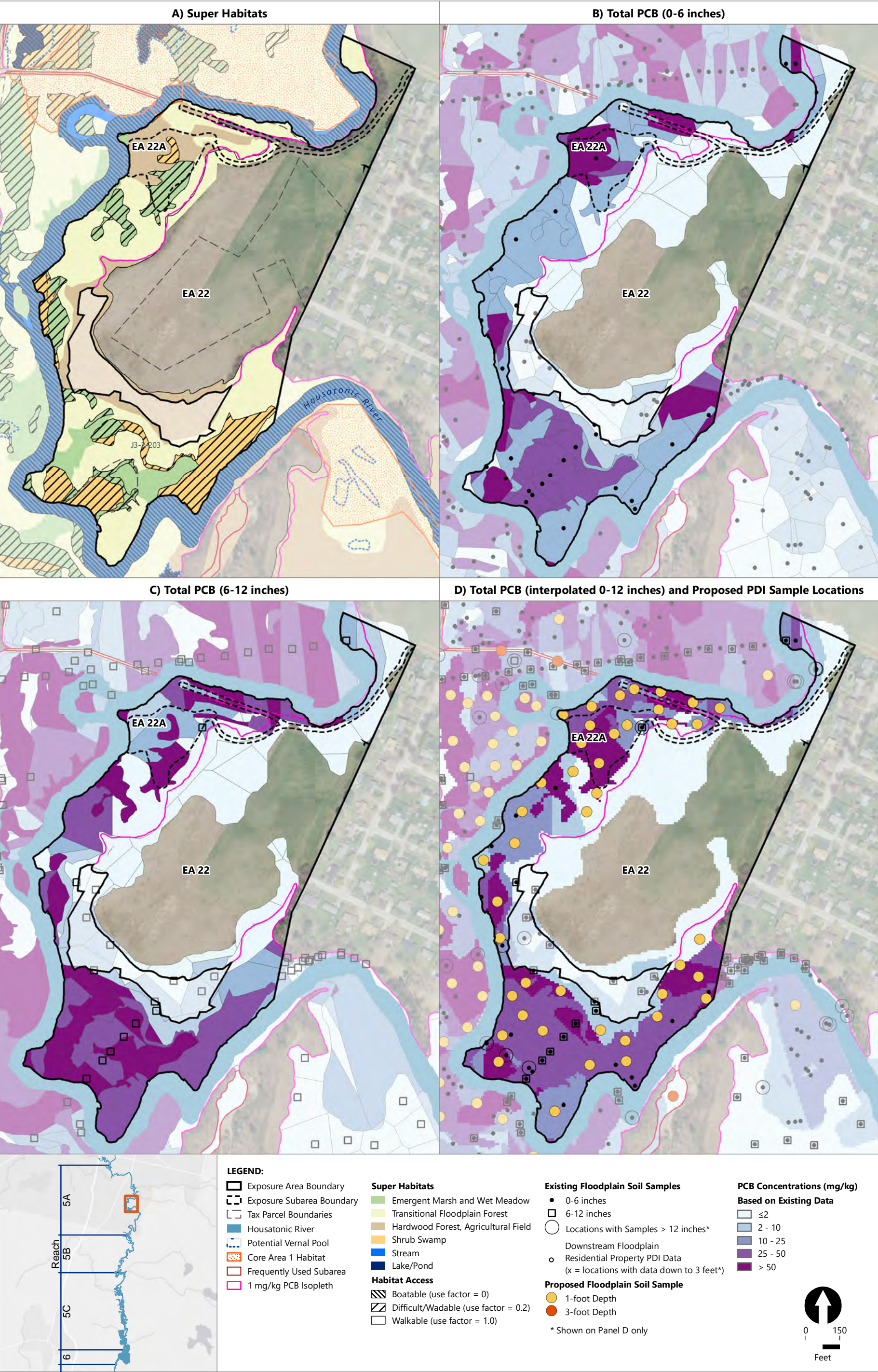




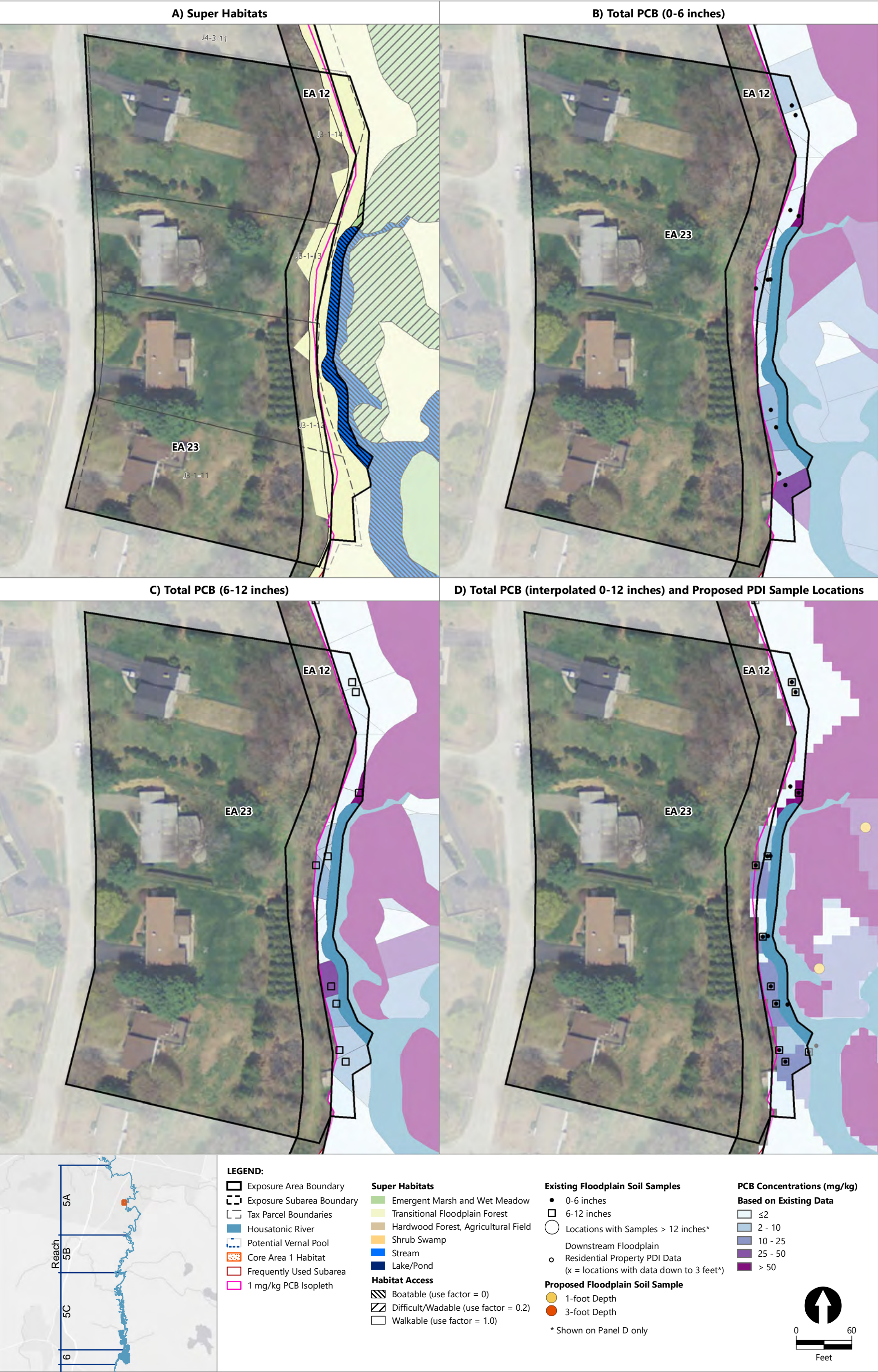


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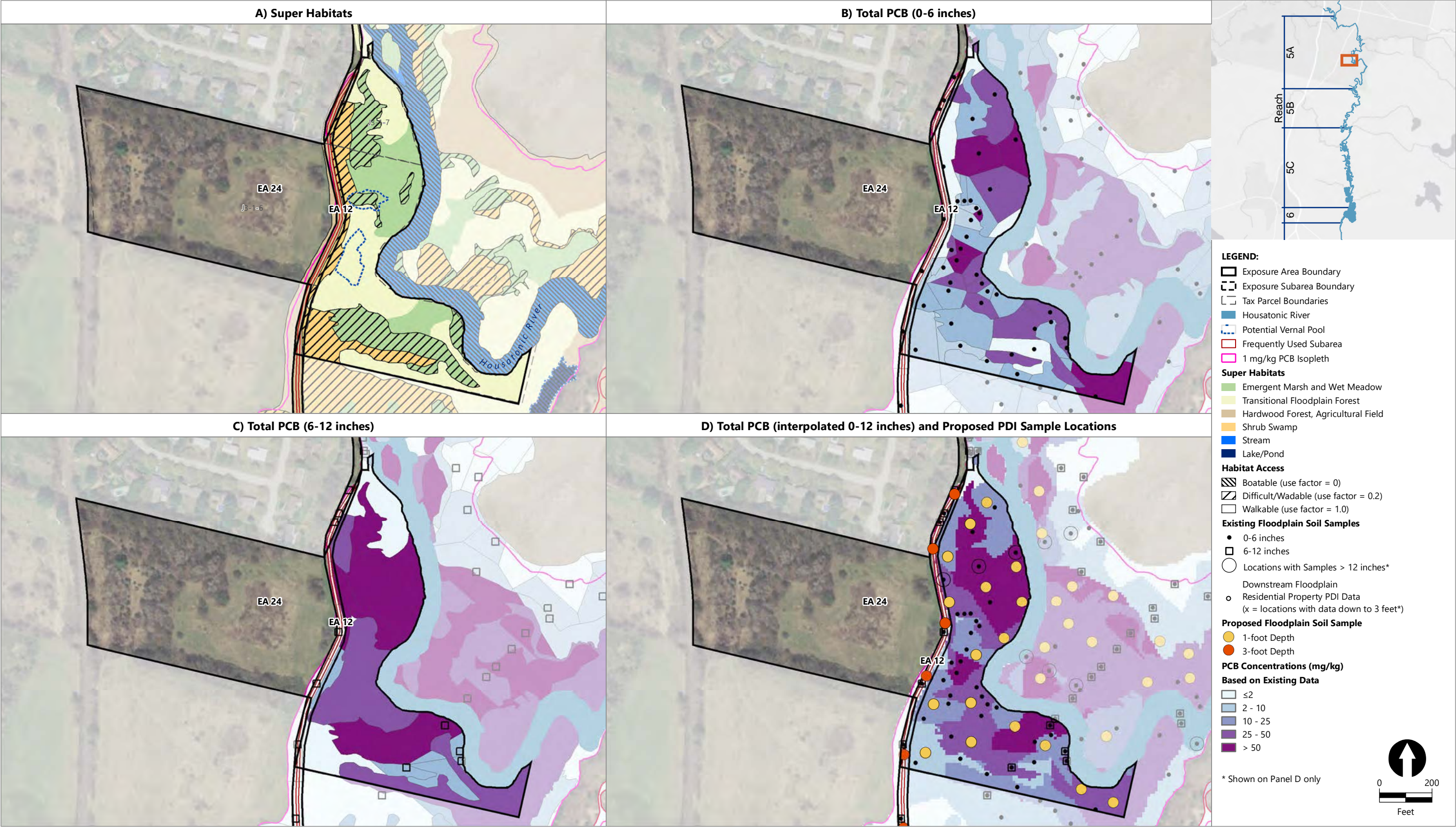










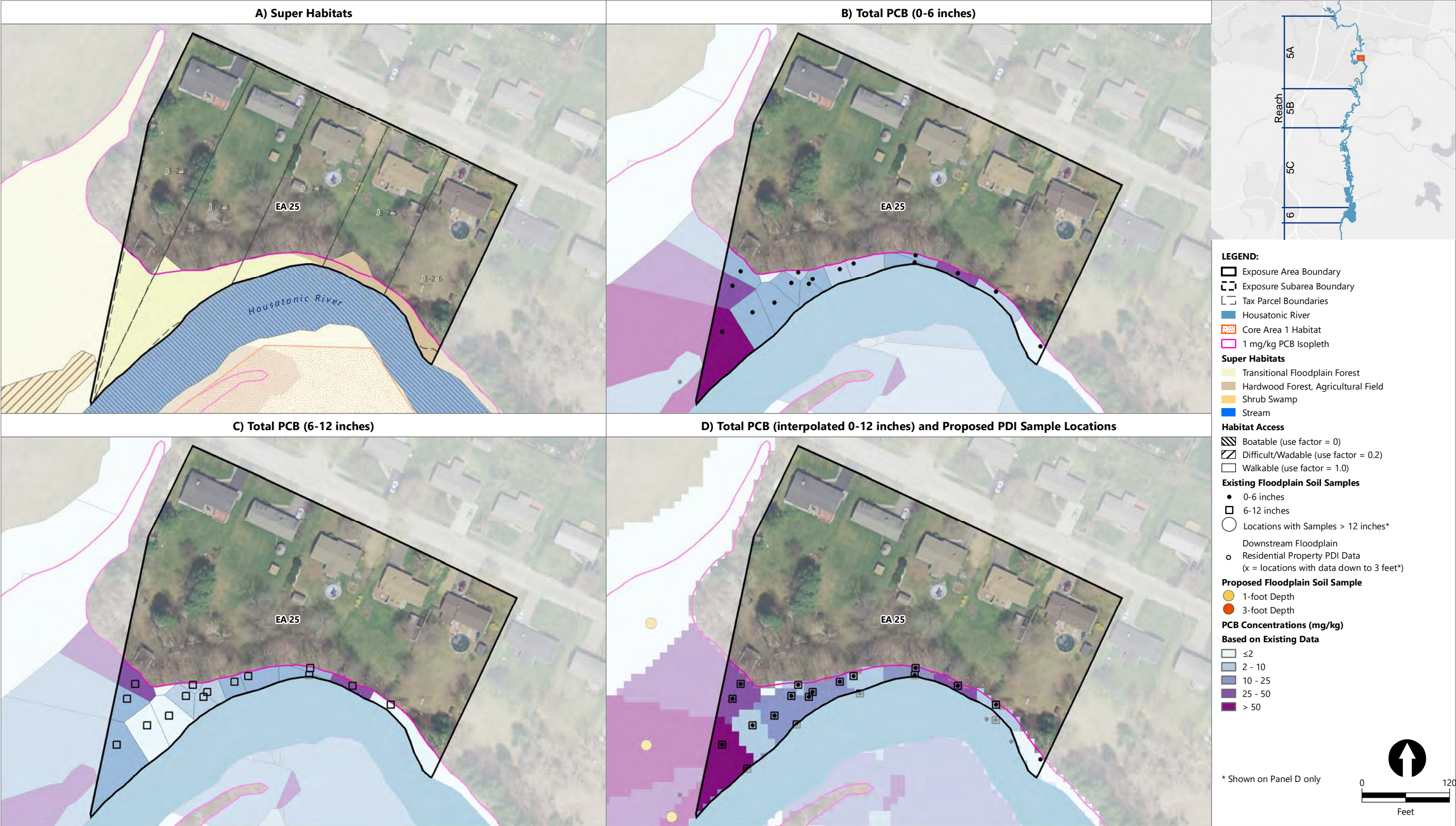


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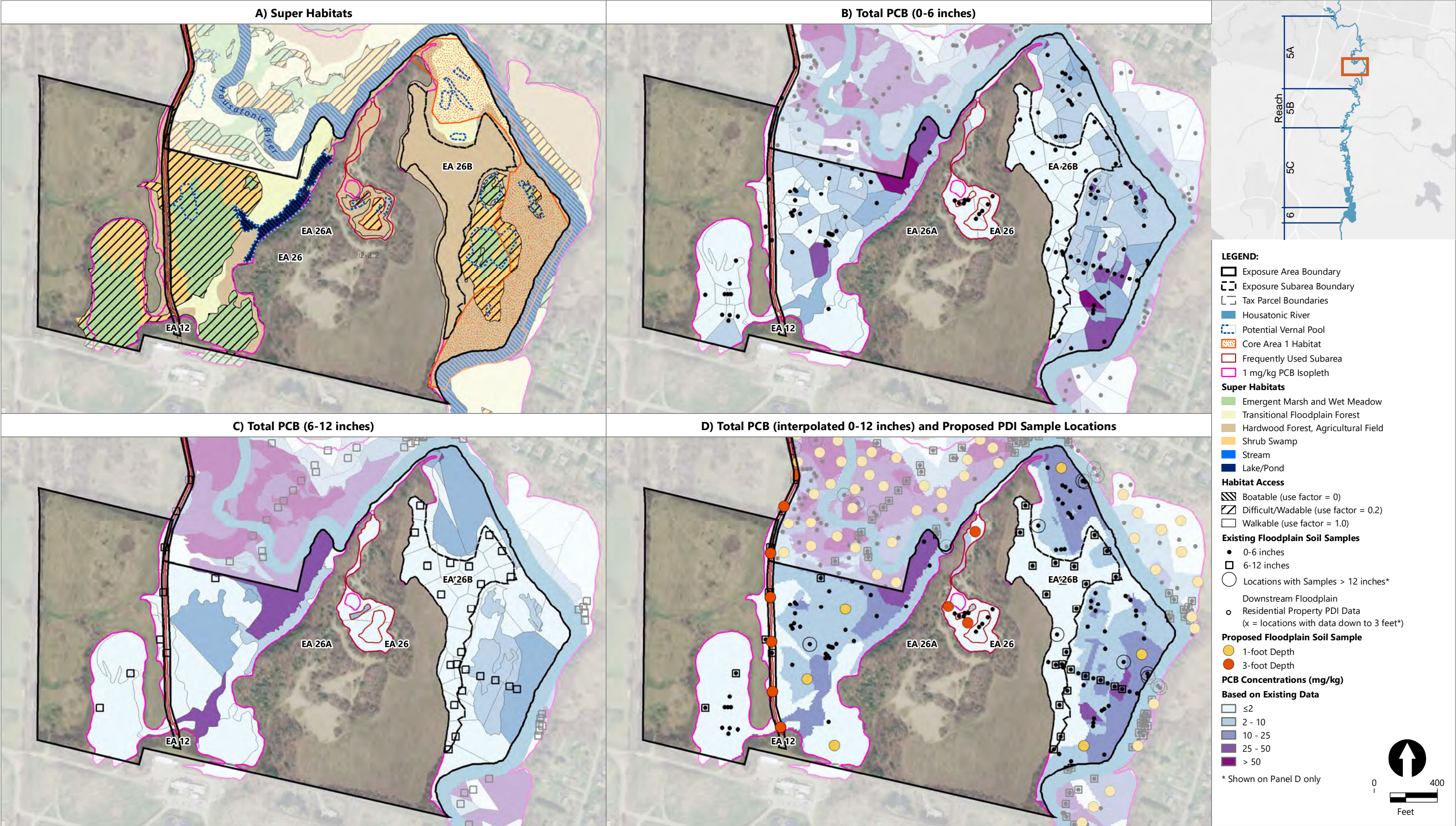


**Figure 4-18**  
**Exposure Areas 24 and 12 (partial)**  
Floodplain Pre-Design Investigation Work Plan – Reach 5A  
Housatonic River







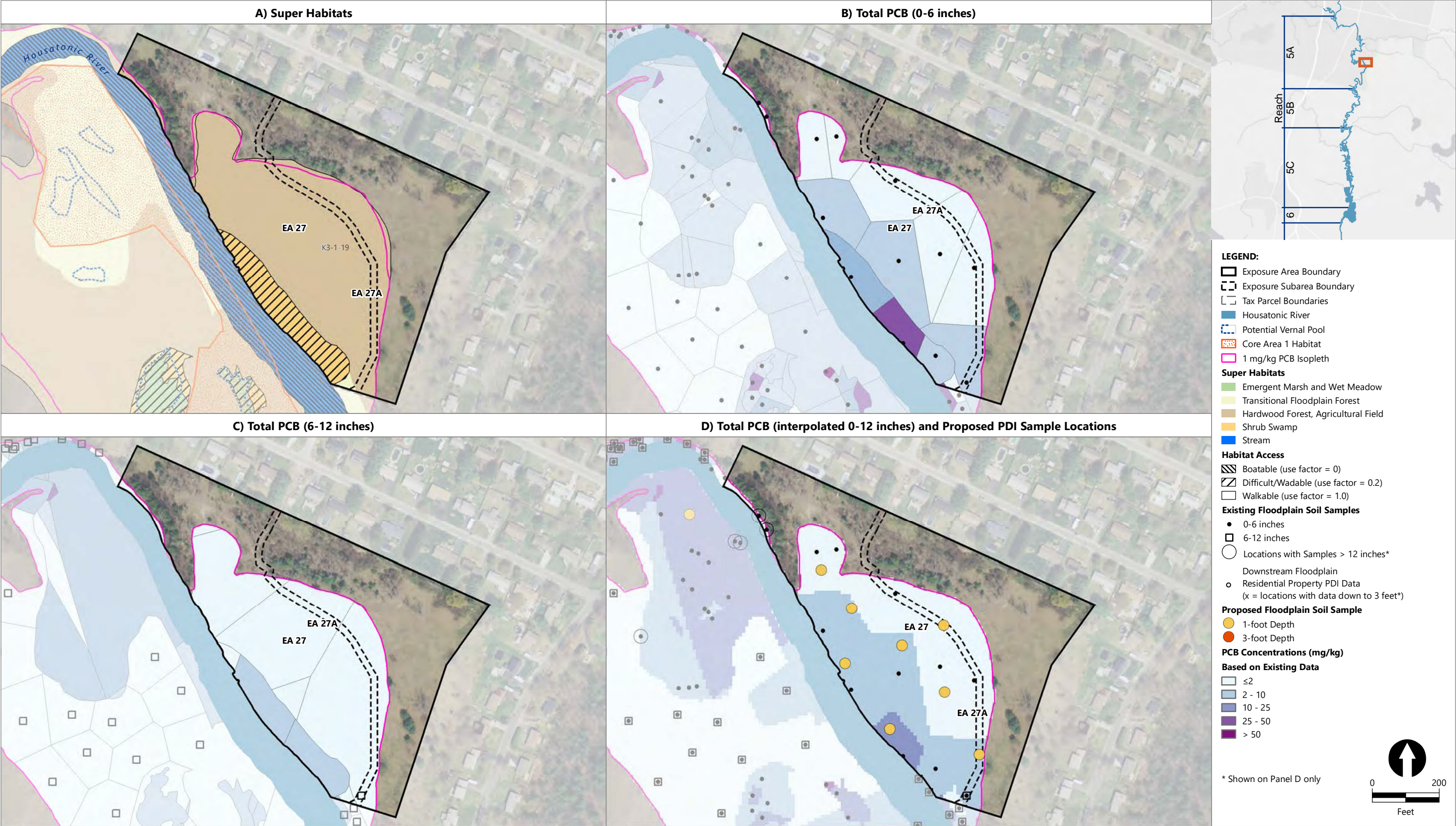


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**Figure 4-20**  
**Exposure Areas 26 and 12 (partial)**  
Floodplain Pre-Design Investigation Work Plan – Reach 5A  
Housatonic River











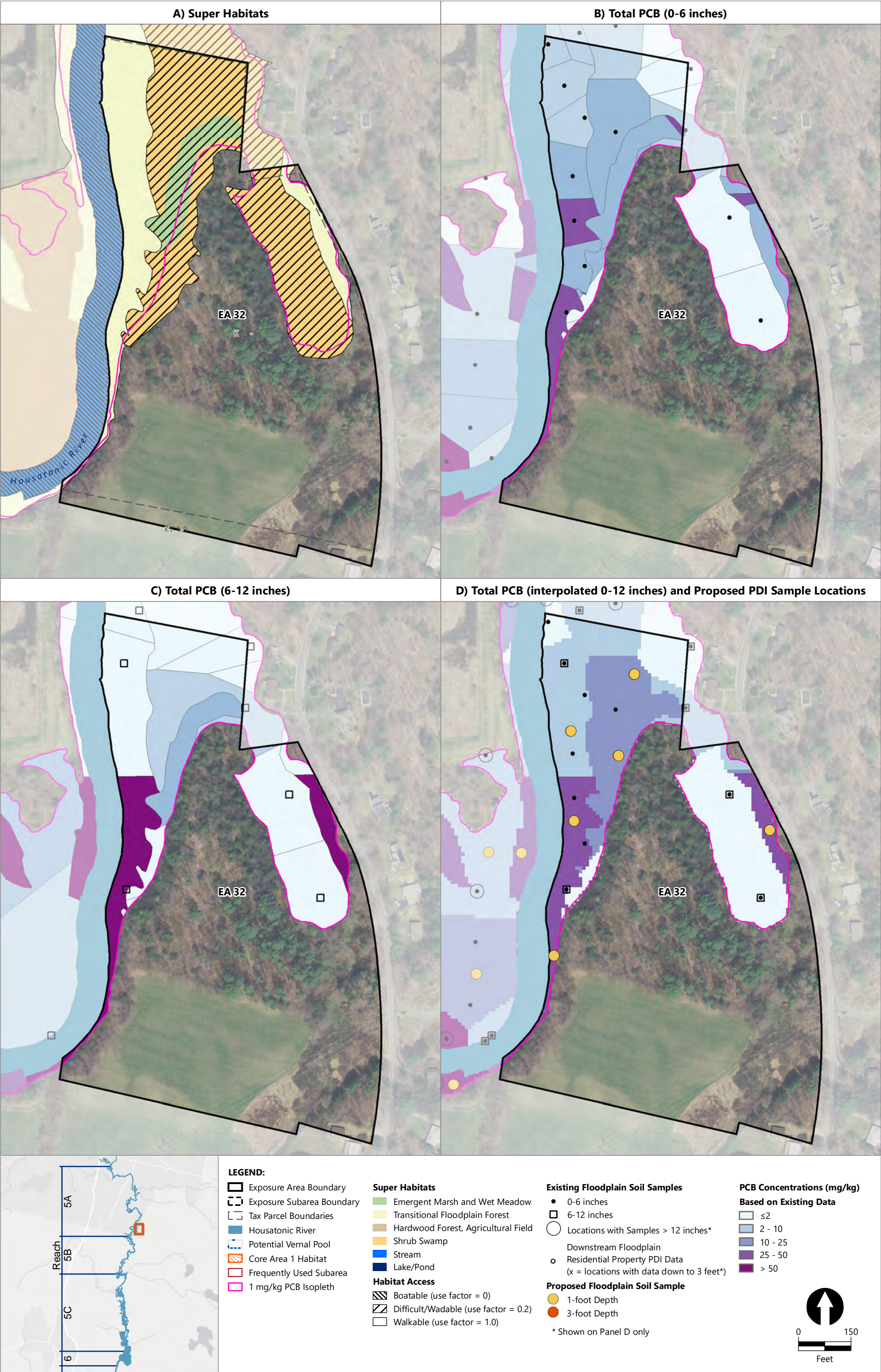


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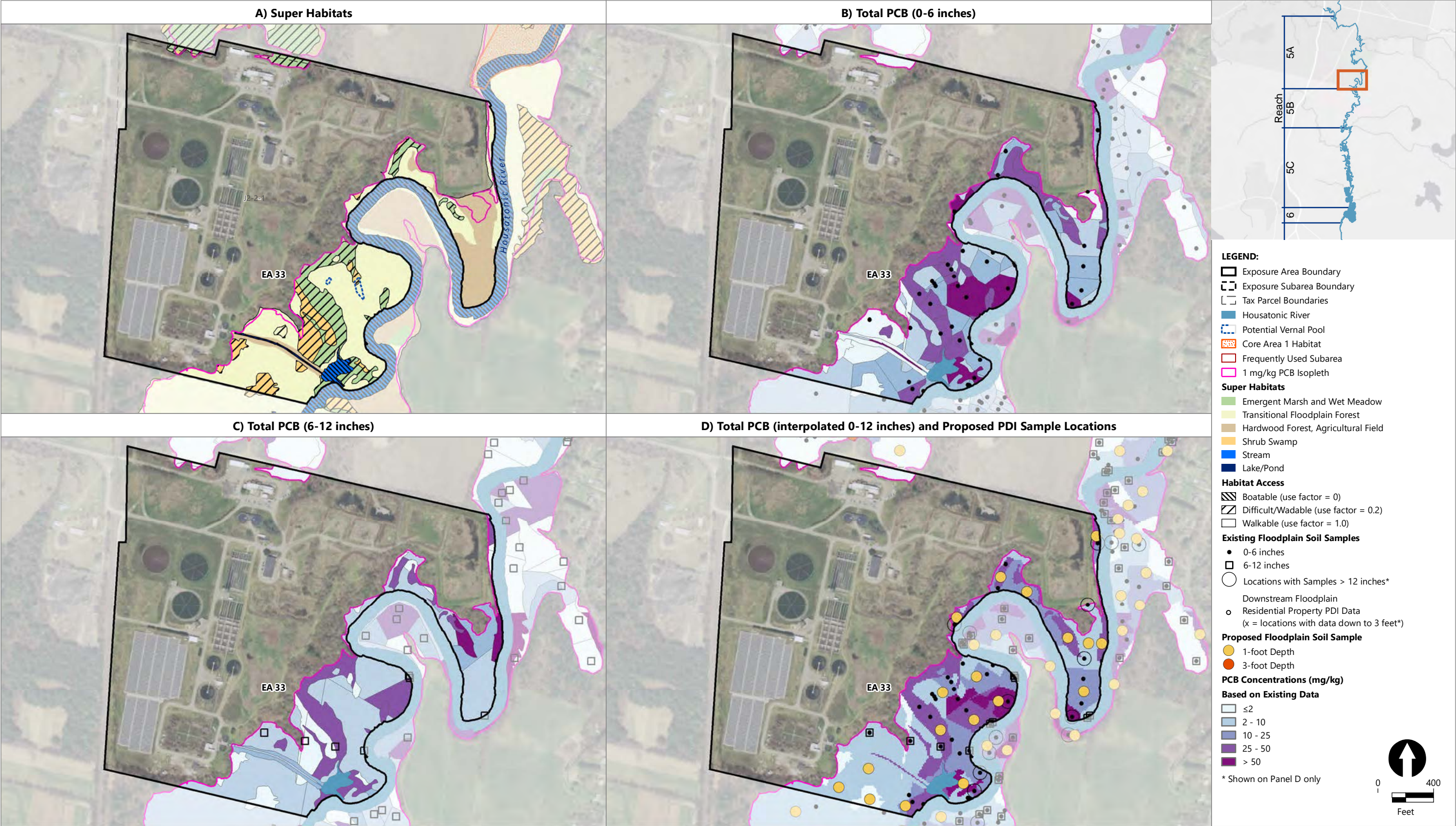


**Figure 4-23**  
**Exposure Areas 31 and 64**  
Floodplain Pre-Design Investigation Work Plan – Reach 5A  
Housatonic River







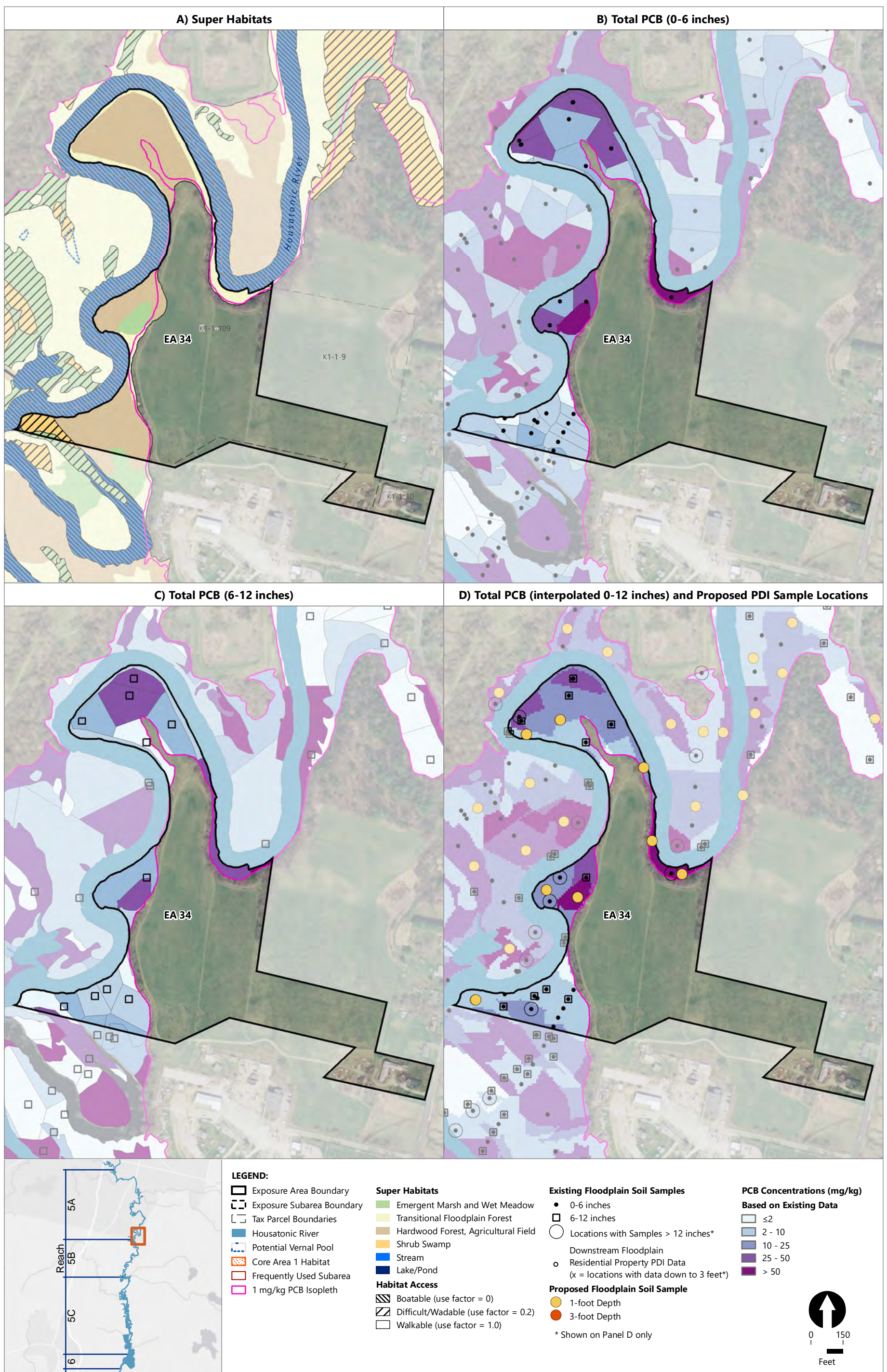


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**Figure 4-25**  
**Exposure Area 33**  
Floodplain Pre-Design Investigation Work Plan – Reach 5A  
Housatonic River







Appendix A  
NHESP Vernal Pool Field Observation  
Form

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**Instructions (continued)**

4. Certification by the Facultative Amphibian Method - provide photo, video, or audio (chorusing) of the required breeding evidence and photo(s) or video of the pool holding water **AND** dry.

6. Provide information to help distinguish the pool & assess its features.

7. All required biological & physical evidence must be documented by good quality photos, video, or audio.

8. Indicate the 3 required maps submitted.

**4. Biological Evidence: *Facultative Amphibians***

Breeding evidence<sup>1</sup> of ≥ 2 species must be documented by photos, video, or audio.

Spring peeper		
Gray treefrog		
American toad		
Fowler's toad		

Breeding evidence<sup>1</sup> includes: full breeding choruses (call constant & overlapping), ≥ 5 adults in amplexus, any # of egg masses, tadpoles, and/or transforming juveniles in pool.

**5. Rare Wetland Species**

Were MESA-listed species observed using this pool?

☐ Yes ☐ No

If yes, please submit a Rare Animal Observation Form with photo & map to the NHESP (available at [www.nhesp.org](http://www.nhesp.org)).

**6. Description of Pool and Surroundings ~ Please describe to the best of your ability and knowledge.**

Dimensions (please include measurements or estimates):

Approx. Length: \_\_\_\_\_ Approx. Width: \_\_\_\_\_ Approx. Maximum Depth: \_\_\_\_\_

Describe distinctive features (roads, structures, boulders, foot trails, vegetation types, etc.) which are visible from or near the pool that would help someone recognize it.

Origin of the pool (check): ☐ Natural depression ☐ Human-made pool/ditch ☐ Created wetland/pool ☐ Other or Unknown (describe) \_\_\_\_\_

The pool's hydroperiod is most likely: ☐ Seasonal (drying out in most years) ☐ Semi-permanent (drying partially in most years) ☐ Permanent

Describe any inlet or outlets to/from the pool and their permanence (e.g., streams, culverts, etc).

Land use in vicinity of pool (approx. 100 ft from pool edge – check all that apply): ☐ upland forest ☐ forested wetlands ☐ emergent marsh/scrub-shrub wetland  
☐ agricultural/grassland/meadow ☐ residential/commercial ☐ other \_\_\_\_\_

**7. Documentation Submitted** – Label with pool name or tracking #, town, date taken, observer's name.

☐ Photo(s) ☐ Video ☐ Audio  
☐ Obligate Species ☐ Facultative Species ☐ Pool Holding Water ☐ Dry Pool

**9. Property Owner Information** - Landowner information is optional & is available from local tax assessor's offices.

Name \_\_\_\_\_

Address \_\_\_\_\_

Town \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_ Assessors Map/Pcl# \_\_\_\_\_ (if known)

**10. Observer Information & Signature** – Must be filled out & signed.

Name \_\_\_\_\_

Address \_\_\_\_\_

Town \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Telephone \_\_\_\_\_ E-mail \_\_\_\_\_

I hereby certify under the pains and penalties of perjury that the information contained in this report is true and complete to the best of my knowledge.

Signature \_\_\_\_\_ Date \_\_\_\_\_

Signature of Adult, if Observer is under 18 years of age \_\_\_\_\_

All submissions and supporting documents will be retained by the NHESP and, with the exception of information for MESA-listed species and the identity of minors, are available to interested parties under the Public Records Law.

**8. Maps Submitted**

Pool locus must be delineated & identified with your pool name or tracking #.

**3 REQUIRED MAPS:**

☐ USGS Topographic Map - 1:24,000 or 1:25,000 or better  
☐ Color orthophoto - 1:12,000 or better

**and ≥ 1 of the following:**

☐ Assessor's map (Map and Plot #)  
☐ Professional survey  
☐ Sketch map - with directions and distances from permanent landmarks  
☐ GPS longitude/latitude coordinates:  
 Latitude = \_\_\_\_\_  
 Longitude = \_\_\_\_\_

**SEND COMPLETED, SIGNED FORM & SUPPORTING DOCUMENTATION TO:**

**NHESP - Vernal Pool Certification**  
**MA Division of**  
**Fisheries & Wildlife**  
**1 Rabbit Hill Rd.**  
**Westborough, MA 01581**

**For questions call 508-389-6360**