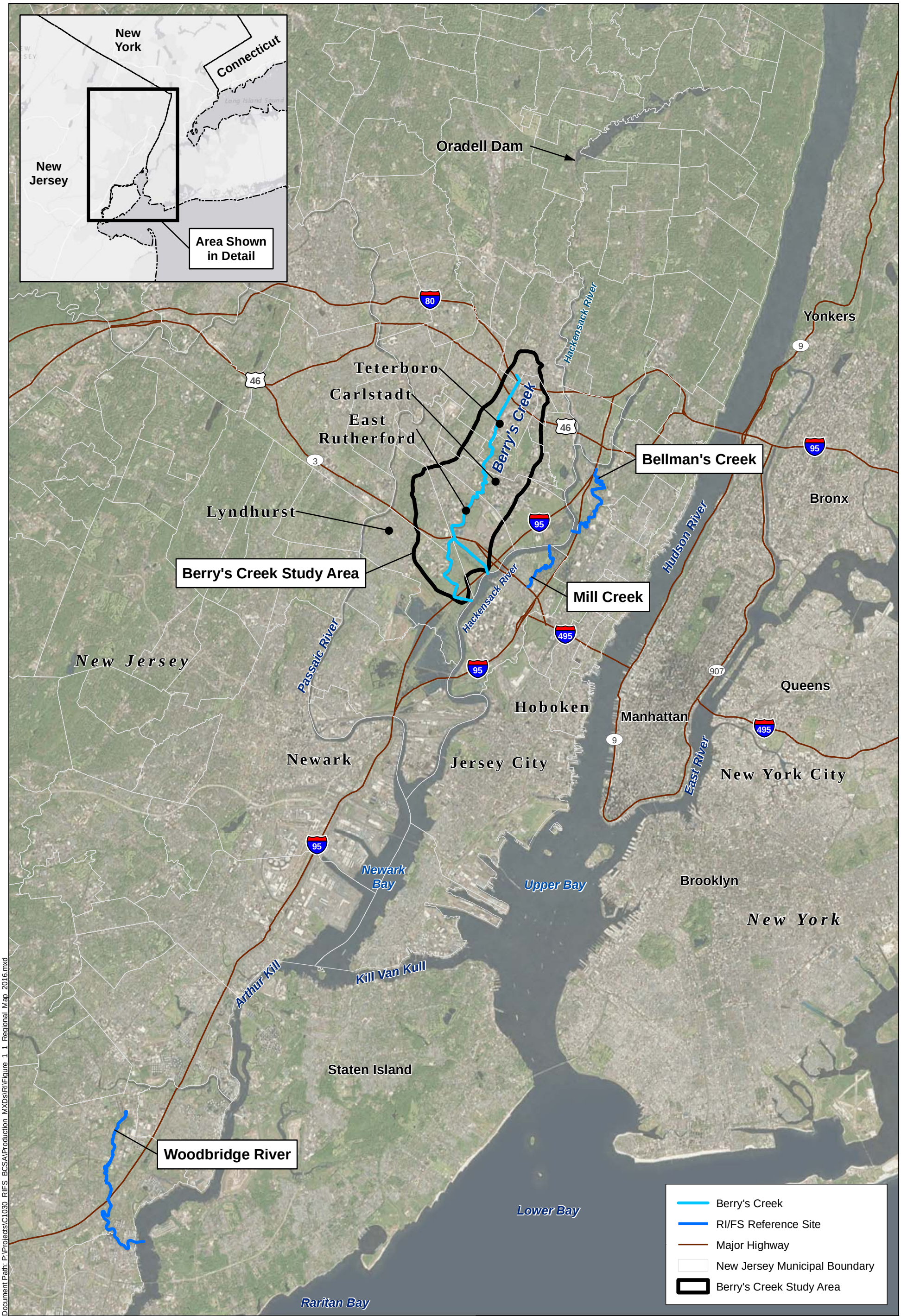


Document Path: P:\Projects\C1030_RIFS_BCSA\Production_MXDs\RI\Figure_1_1_Regional_Map_2016.mxd

Note: Lake Tappan and Lake DeForest are located to the north of the map extent.
Basemap Source: ESRI World Imagery, 2011.

0 0.5 1 2 Miles

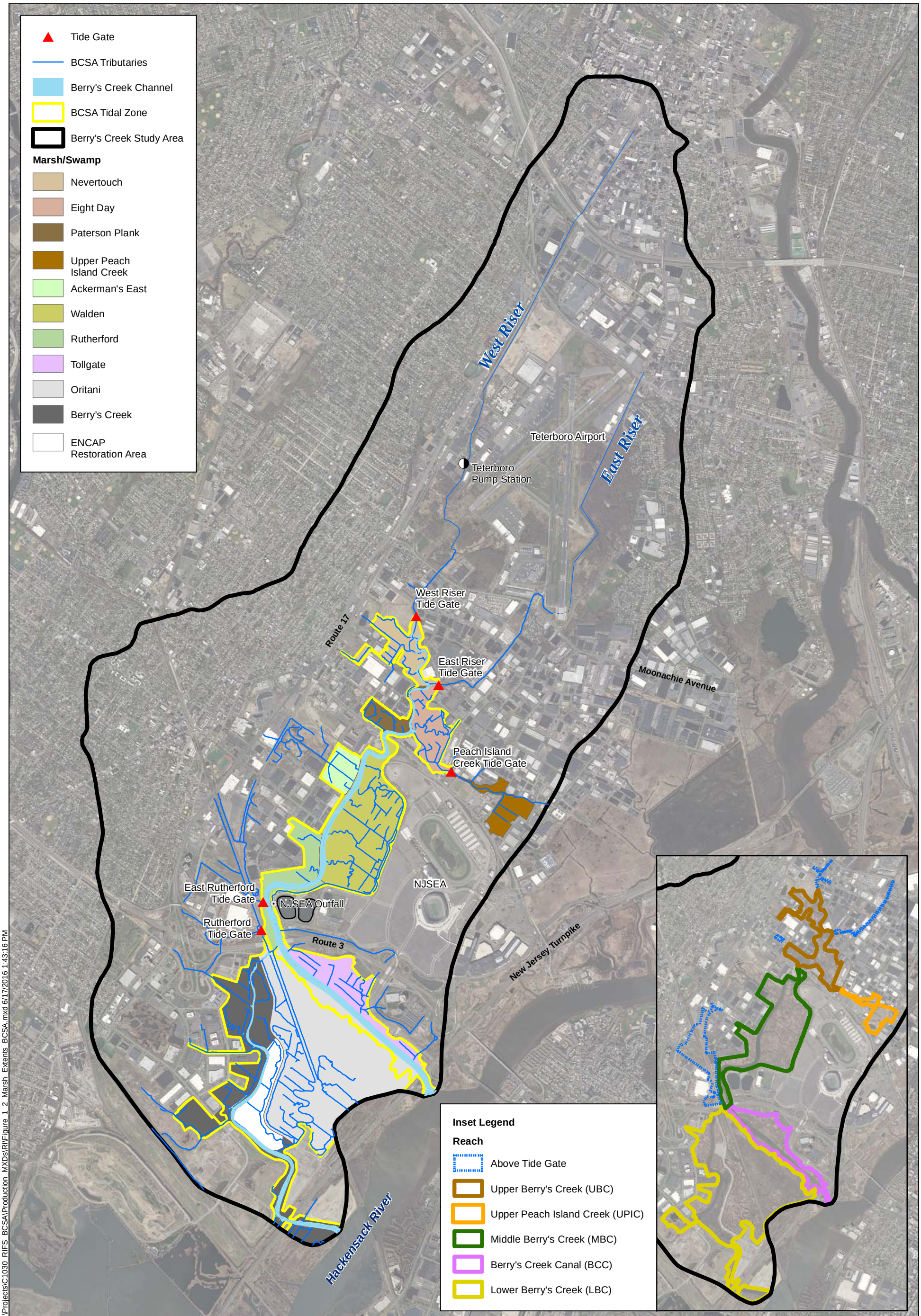
N

DRAFT
DO NOT QUOTE OR CITE

Local Setting of the BCSA

Berry's Creek Study Area Remedial Investigation

Figure **1-1**



Basemap Source: NJ Imagery, Natural, 2012.
Hydrography Source: U.S. Geological Survey National Hydrography Dataset (NHD), 2014.
Note: Not all tide gates are shown.
NJSEA = New Jersey Sports and Exposition Authority

0 0.25 0.5 1 Miles

N

DRAFT

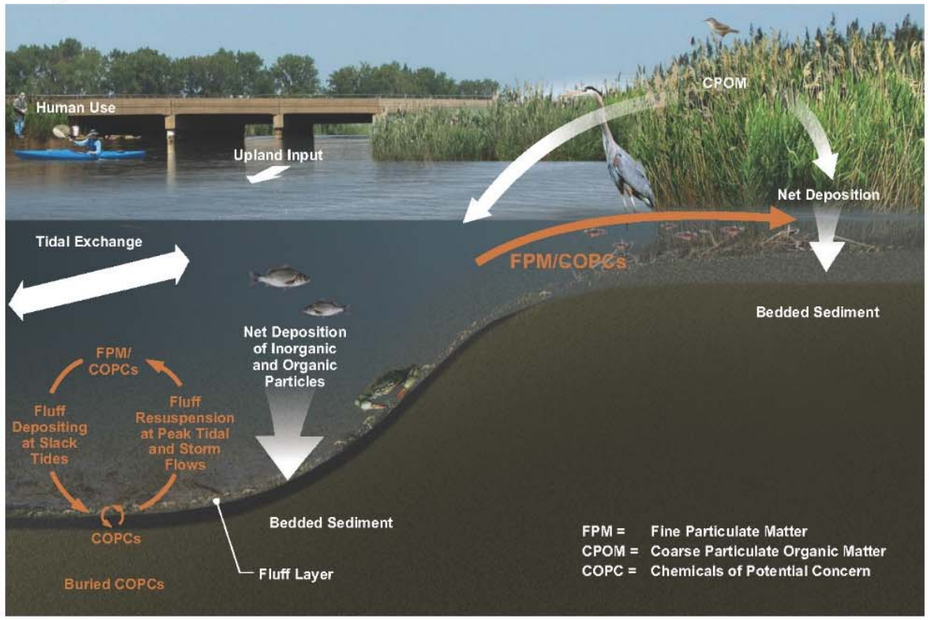
BCSA Marsh Extents and Named Features

Berry's Creek Study Area Remedial Investigation

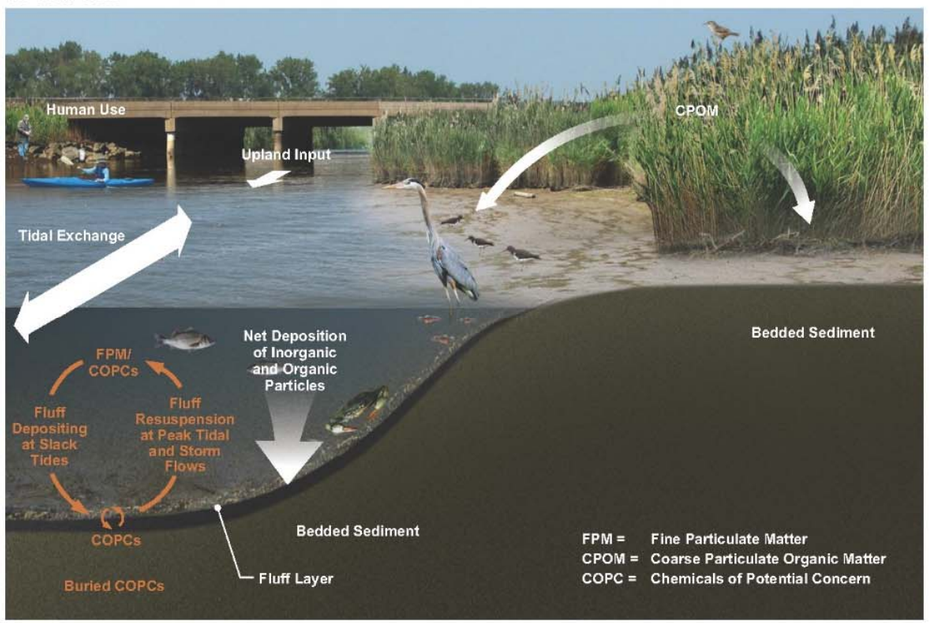
Figure **1-2**

P:\Projects\C1030_RIFS_BCSA\Production_MXDs\RI\Figure_1_2_Marsh_Extents_BCSA.mxd 6/17/2016 1:43:16 PM

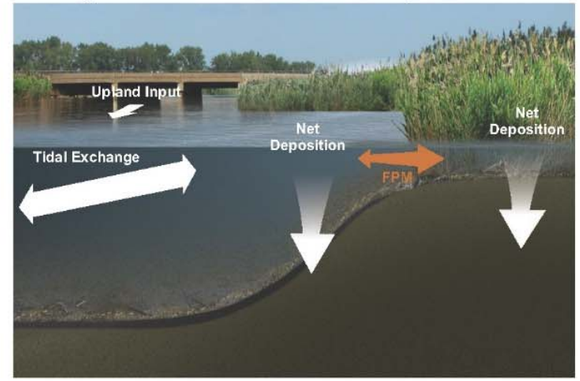
5A High Tide



5B Low Tide

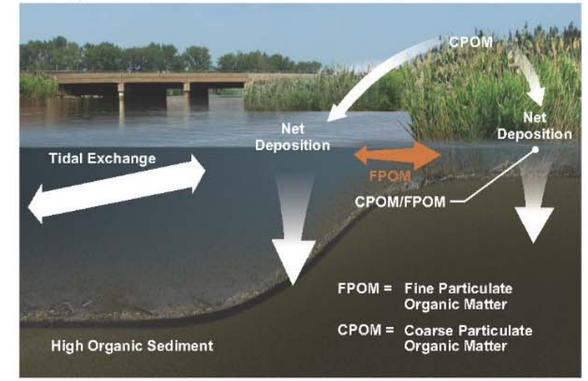


5C Inorganic Particulates Movement and Deposition



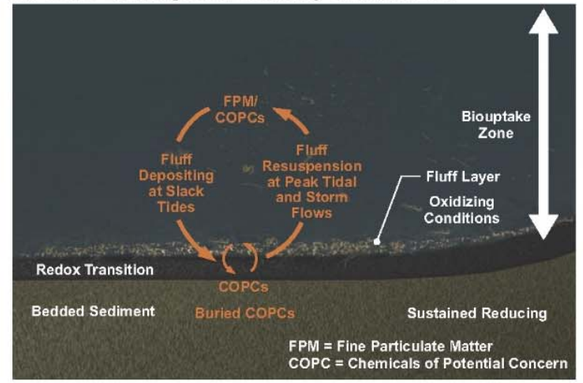
Dominant source is Hackensack River and primary sink is the marsh areas

5D Organic Particulates Movement and Deposition



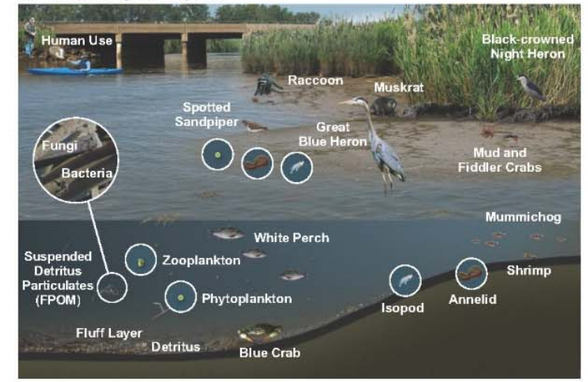
Dominant source is marshes in BCSA

5E COPC Exchange with Waterway Sediment Bed



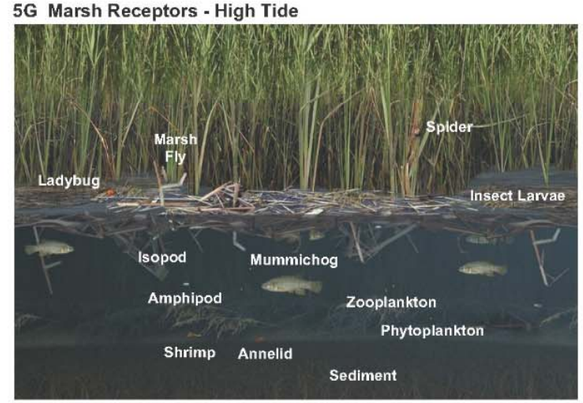
Limited exchange of COPCs in waterway sediment with area of biouptake; thin FPM "fluff layer" (<0.5 cm) is where physical and chemical processes control the exchange.

5F Waterway Receptors



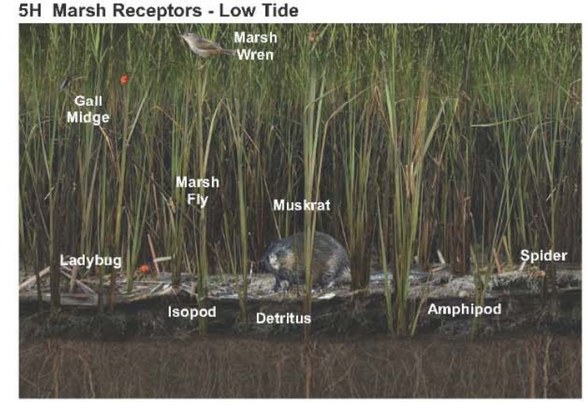
Detritus based food web

5G Marsh Receptors - High Tide



Some waterway species move into marsh and up plant stalks during high tide

5H Marsh Receptors - Low Tide



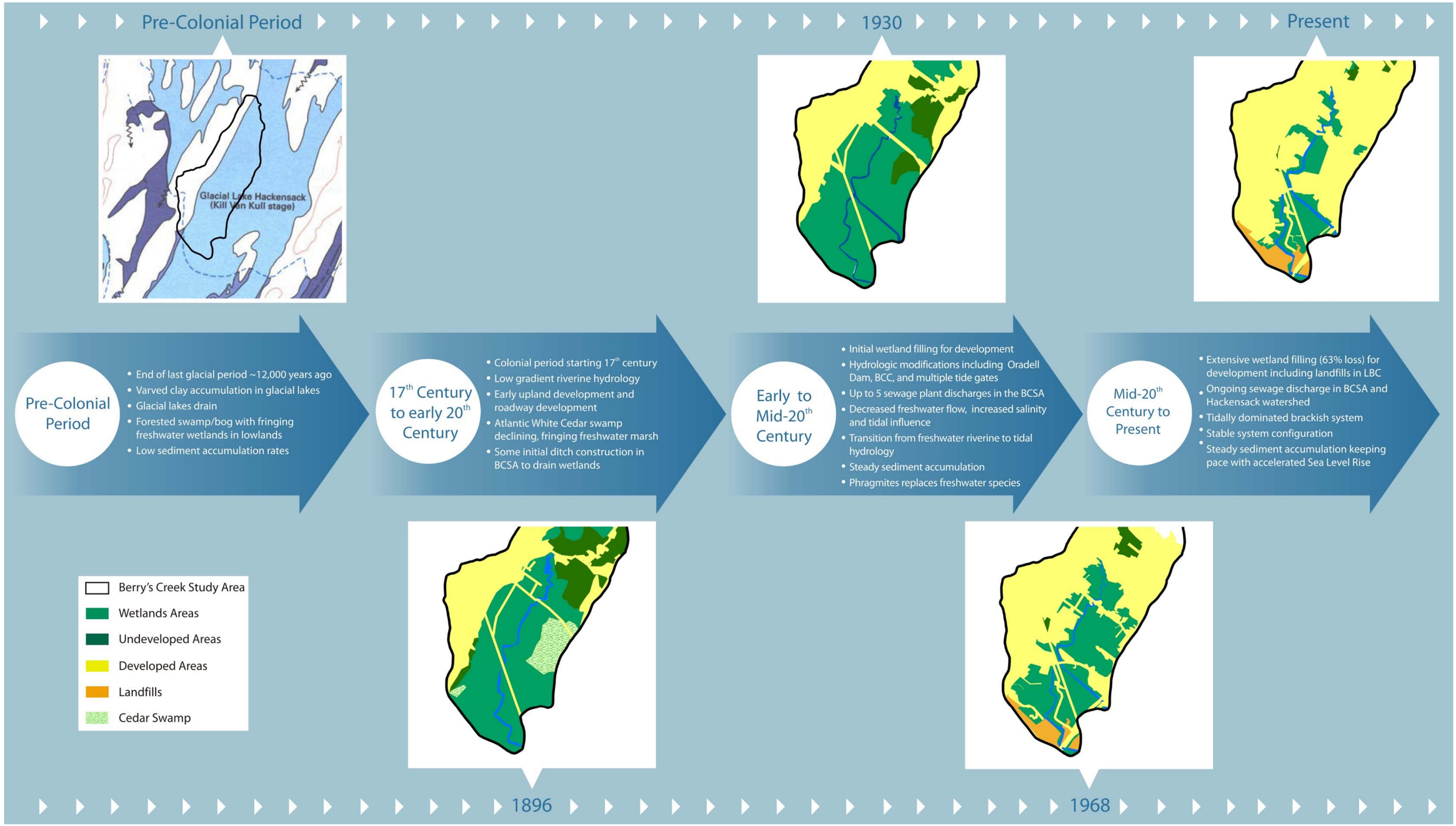
Receptor activity primarily on vegetation, detritus on surface of marsh and top 2 cm of sediment

DRAFT

BCSA Conceptual Site Model (CSM) of Key Physical and Chemical Processes; Human Use and Ecological Receptors

Berry's Creek Study Area Remedial Investigation

Figure **2-1**

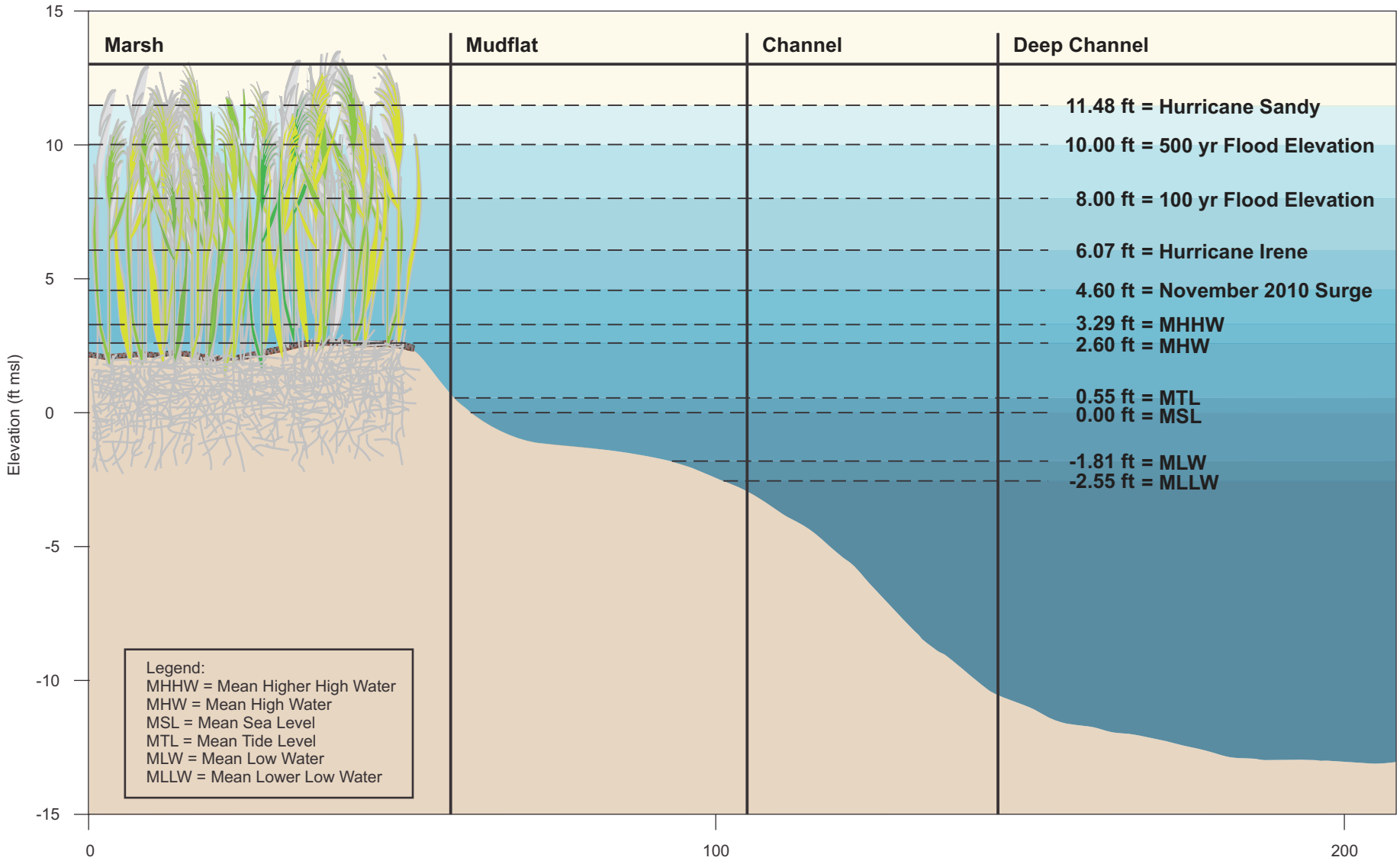


DRAFT

Timeline of BCSA Site Development and Land Cover Changes

Berry's Creek Study Area Remedial Investigation

Figure
4-1

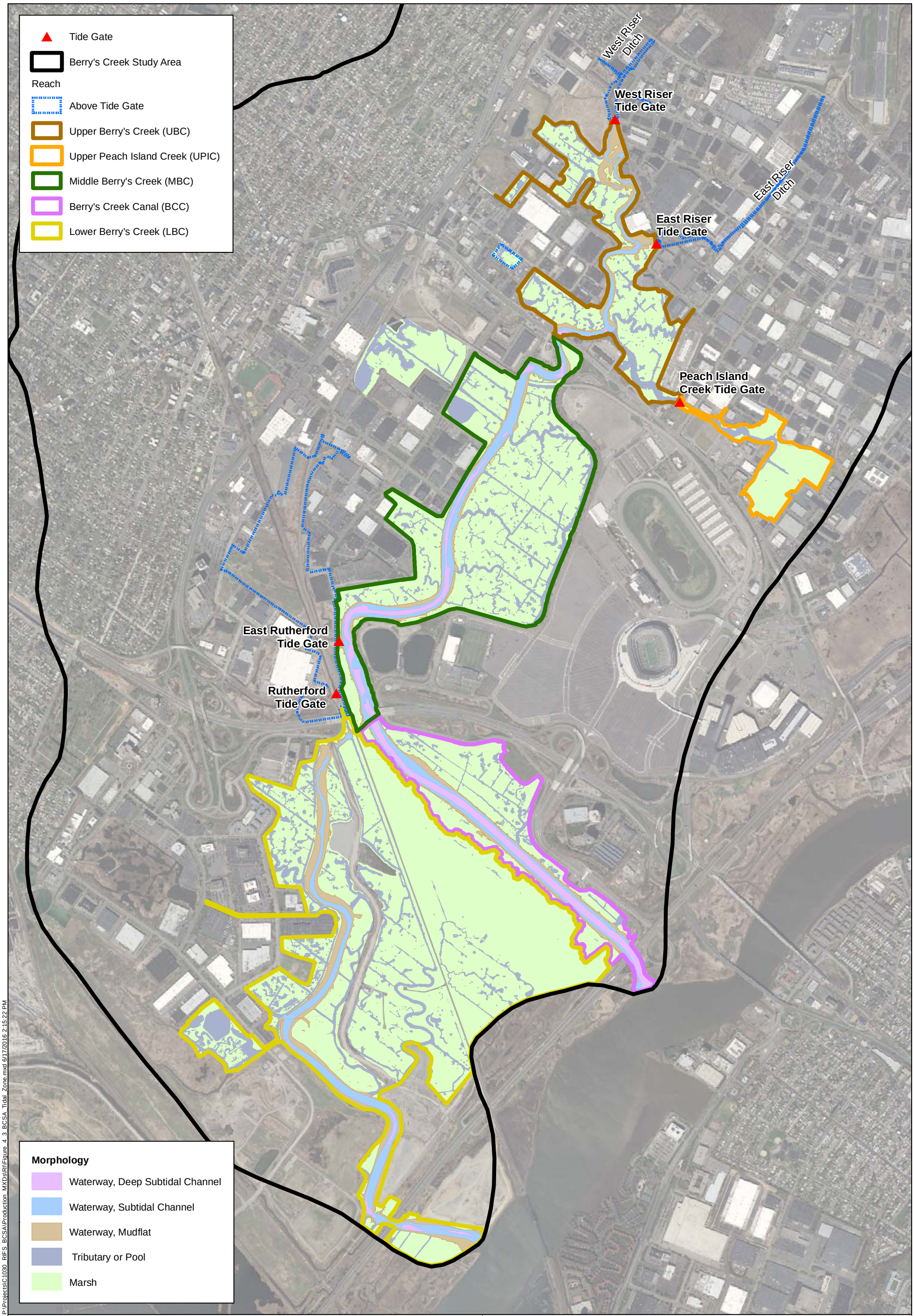


Notes:
Tidal datums were calculated from water elevations measured at MHS-01 during Phase 1 and 2 monitoring.
Tidal elevations for Hurricane Irene and the November 2010 Surge event were measured at MHS-01.
Tidal elevations for Hurricane Sandy and the March 14, 2010 Nor'easter were measured at the Battery, NY tidal gauge (NOAA Tides & Currents, Station 8518750), as water elevation data in the BCSA are not available.
March 2010 Nor'easter tidal surge was 6.26 ft msl, which is approximately equal to the Hurricane Irene tidal surge.

Tidal Elevations in BCSA under Typical Conditions and During Major Storm Surge Events

Berry's Creek Study Area Remedial Investigation

Figure **4-2**



P:\Projects\C1030_RIFS_BCSA\Production_MXDs\RI\Figure_4_3_BCSA_Tidal_Zone.mxd 6/17/2016 2:15:22 PM

Note: Not all tide gates are shown.
Basemap Source: NJ Imagery, Natural, 2012.

0 1,000 2,000 Feet

N

DRAFT

BCSA Tidal Zone Morphology

Berry's Creek Study Area Remedial Investigation

Figure **4-3**

Surface Sediment Morphology

- Marsh
- Tributary
- Main Channel
- Above Tide Gate

Mercury Concentration (mg/kg)

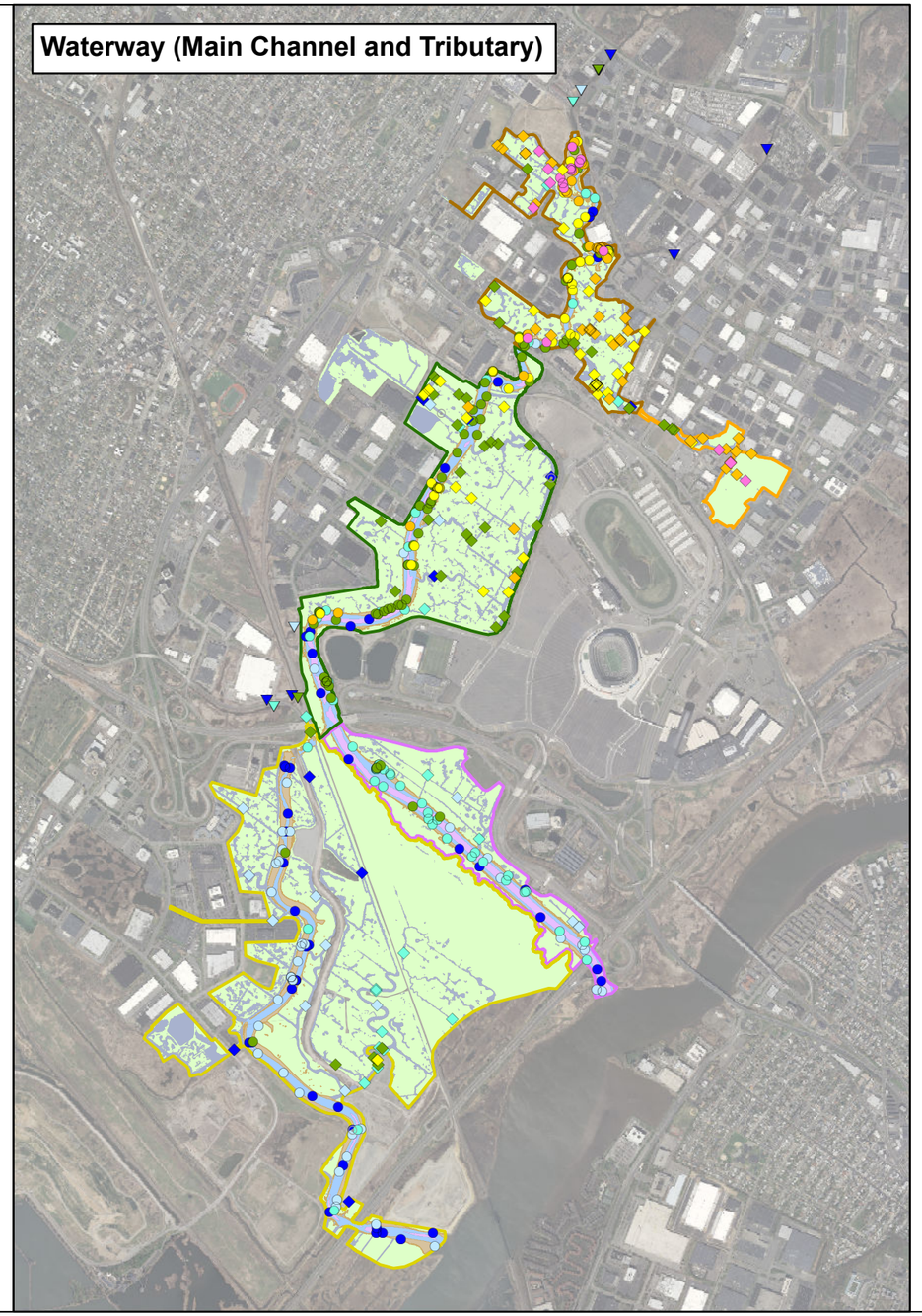
- ≤2.5
- >2.5 - 5
- >5 - 10
- >10 - 25
- >25 - 50
- >50 - 175
- >175
- Nondetect

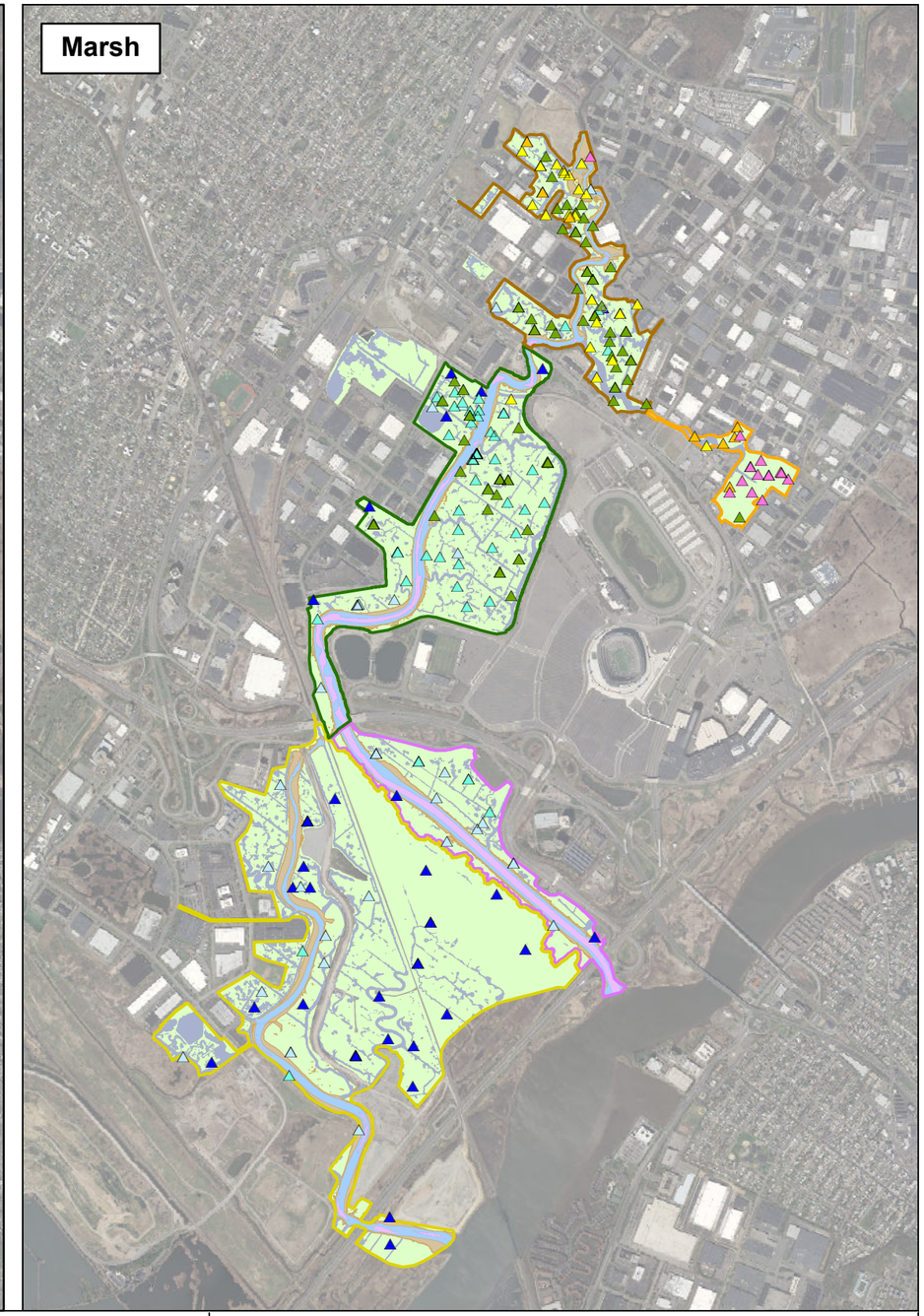
Reach

- Above Tide Gate
- Upper Berry's Creek (UBC)
- Upper Peach Island Creek (UPIC)
- Middle Berry's Creek (MBC)
- Berry's Creek Canal (BCC)
- Lower Berry's Creek (LBC)

Morphology

- Main Channel, Deep Subtidal
- Main Channel, Subtidal
- Main Channel, Mudflat
- Tributary or Pool
- Marsh





0 1,250 2,500 Feet

N

Notes:
Surface sediment is defined as:
1. UBC waterway - 0-6 cm
2. Other reach waterway - 0-10 cm
3. Marsh sediment - 0-5 cm
Aerial Source: NJ Imagery, Natural, 2012.

DRAFT

Surface Sediment COPC Concentrations in Berry's Creek Study Area: Mercury

Berry's Creek Study Area Remedial Investigation

Figure **5-1**

N:\GIS\Projects\C1030_RIFS_BCSA\Production_MXDs\RI_Report\Appendix_F_Sediment\Figure_3_13a_Hg_Map_surface_sed_BCSA.mxd 6/16/2016 11:32:22 AM

Surface Sediment Morphology

- Marsh
- Tributary
- Main Channel
- Above Tide Gate

PCBs (Total Aroclors) Concentration (mg/kg)

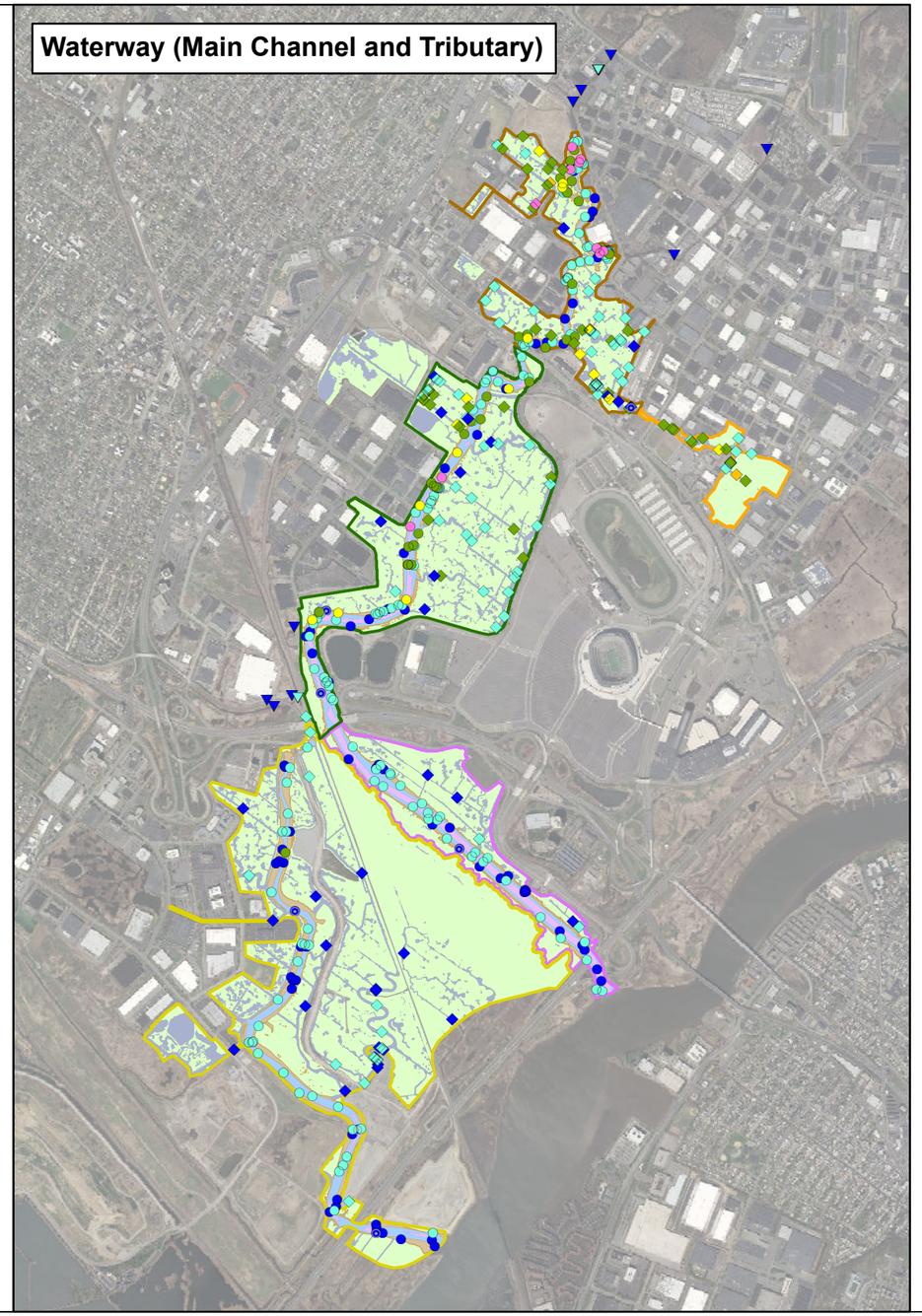
- ≤0.5
- >0.5 to 2
- >2 to 5
- >5 to 10
- >10 to 15
- >15
- Nondetect

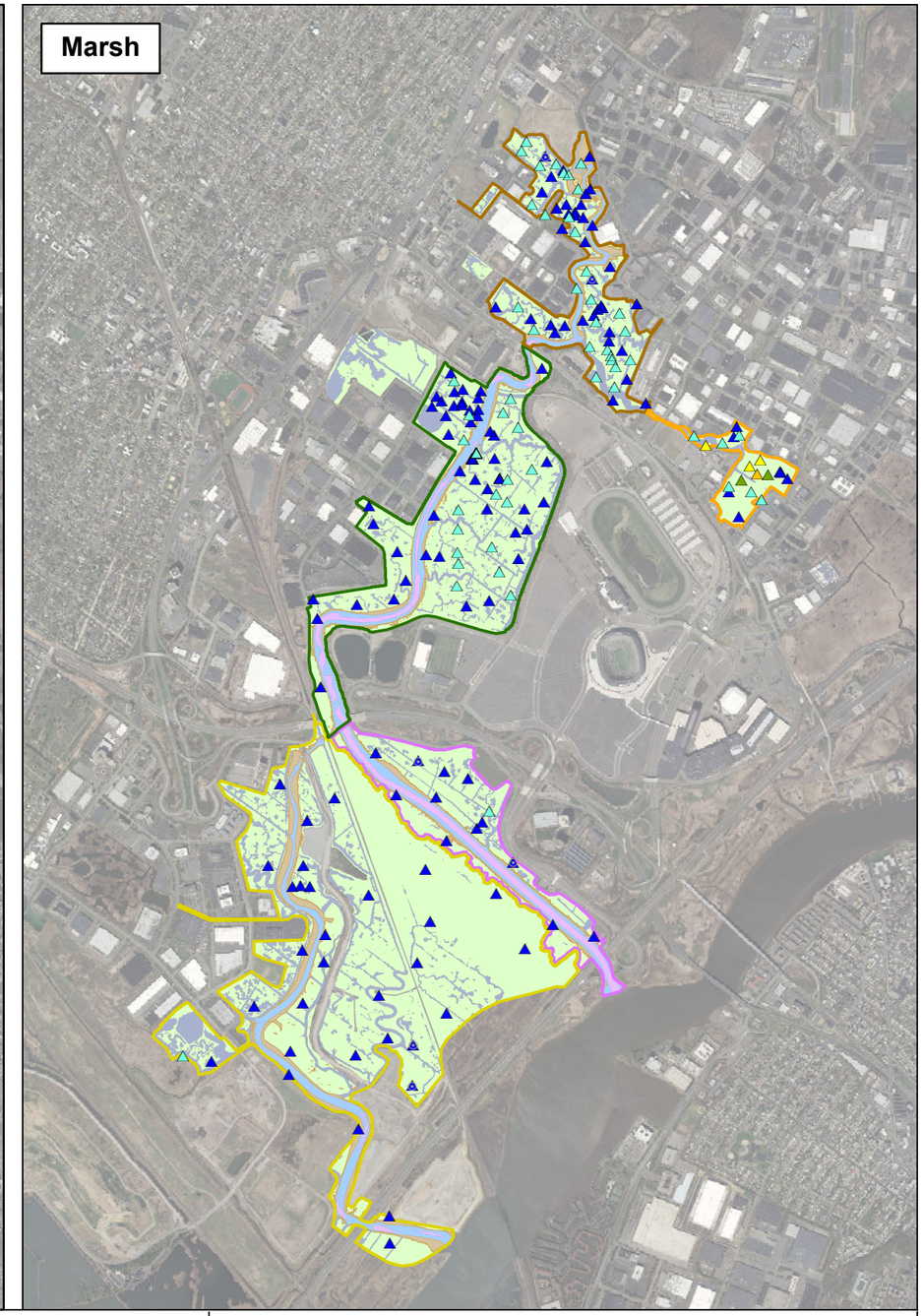
Reach

- Above Tide Gate
- Upper Berry's Creek (UBC)
- Upper Peach Island Creek (UPIC)
- Middle Berry's Creek (MBC)
- Berry's Creek Canal (BCC)
- Lower Berry's Creek (LBC)

Morphology

- Main Channel, Deep Subtidal
- Main Channel, Subtidal
- Main Channel, Mudflat
- Tributary or Pool
- Marsh





0 1,250 2,500 Feet

N

Notes:
Surface sediment is defined as:
1. UBC waterway - 0-6 cm
2. Other reach waterway - 0-10 cm
3. Marsh sediment - 0-5 cm
Aerial Source: NJ Imagery, Natural, 2012.

DRAFT

Surface Sediment COPC Concentrations in Berry's Creek Study Area: PCBs (Total Aroclors)

Berry's Creek Study Area Remedial Investigation

Figure **5-2**

N:\GIS\Projects\C1030_RIFS_BCSA\Production_MXDs\RI_Report\Appendix_F_Sediment\Figure_3_15a_PCBs_Map_surface_sed_BCSA.mxd 6/16/2016 11:47:45 AM

Surface Sediment Morphology

- Marsh
- Tributary
- Main Channel
- Above Tide Gate

Methyl Mercury Concentration (µg/kg)

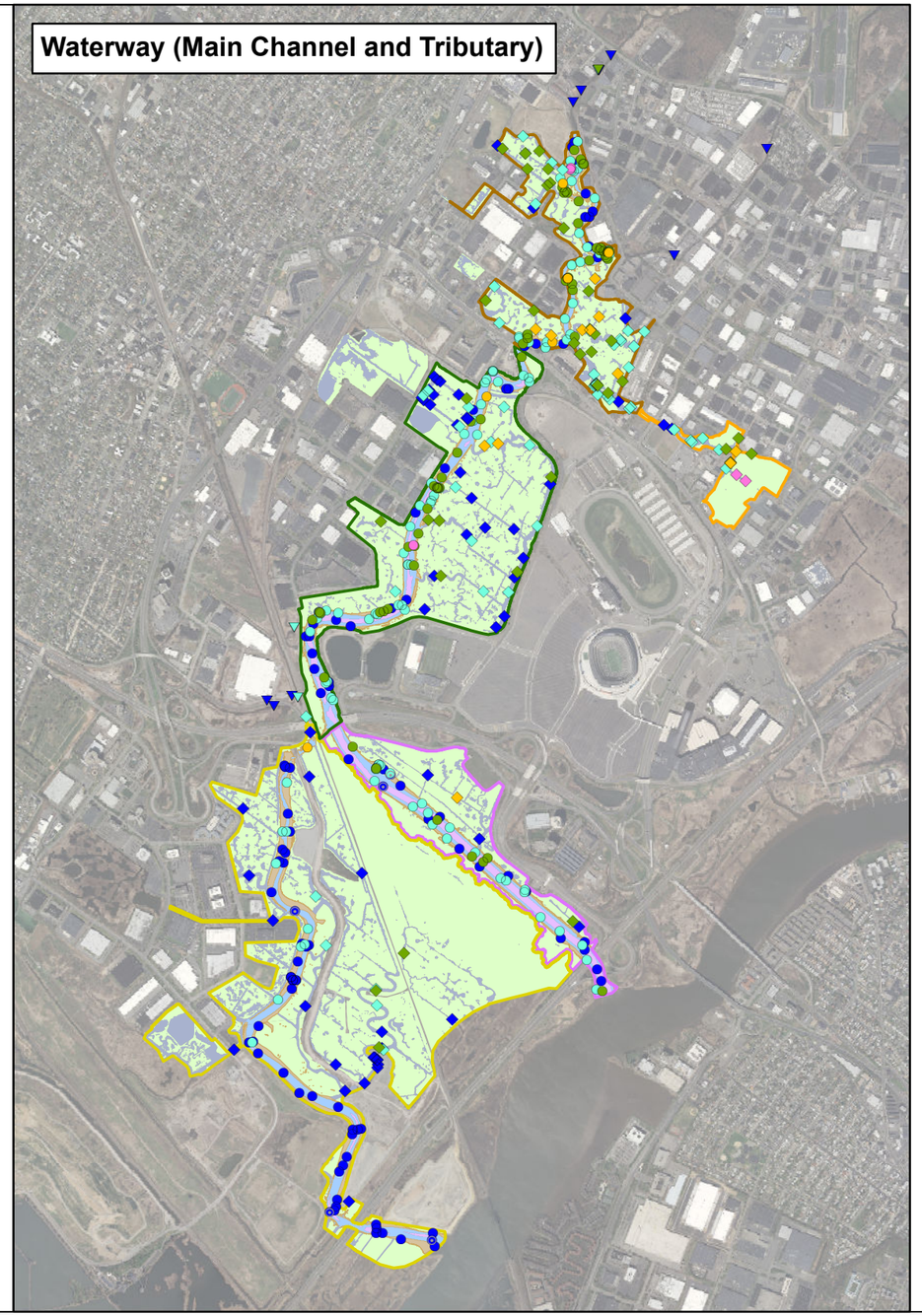
- ≤10
- >10 to 25
- >25 to 50
- >50 to 100
- >100
- Nondetect

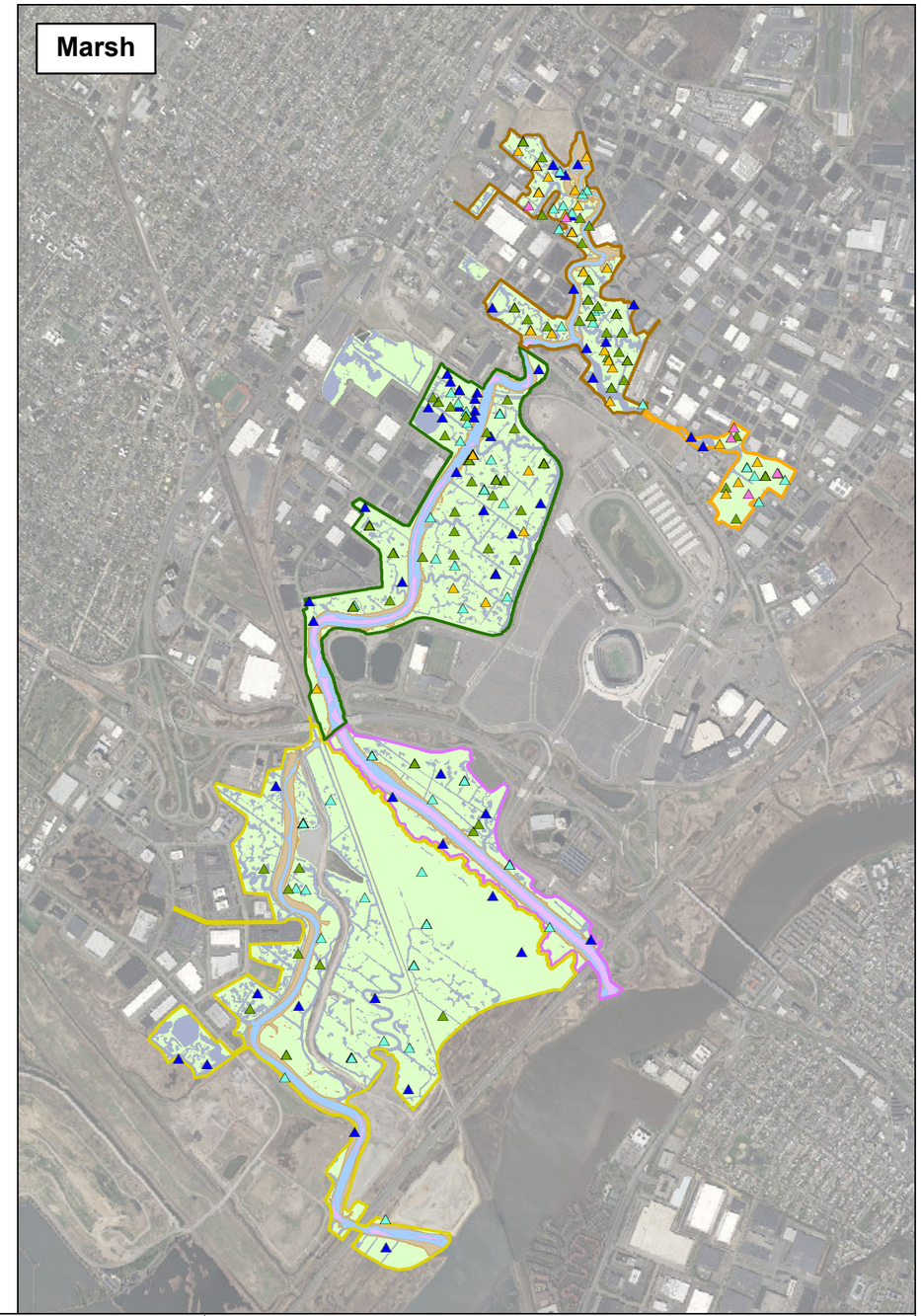
Reach

- Above Tide Gate
- Upper Berry's Creek (UBC)
- Upper Peach Island Creek (UPIC)
- Middle Berry's Creek (MBC)
- Berry's Creek Canal (BCC)
- Lower Berry's Creek (LBC)

Morphology

- Main Channel, Deep Subtidal
- Main Channel, Subtidal
- Main Channel, Mudflat
- Tributary or Pool
- Marsh





0 1,250 2,500 Feet

N

Notes:
Surface sediment is defined as:
1. UBC waterway - 0-6 cm
2. Other reach waterway - 0-10 cm
3. Marsh sediment - 0-5 cm
Aerial Source: NJ Imagery, Natural, 2012.

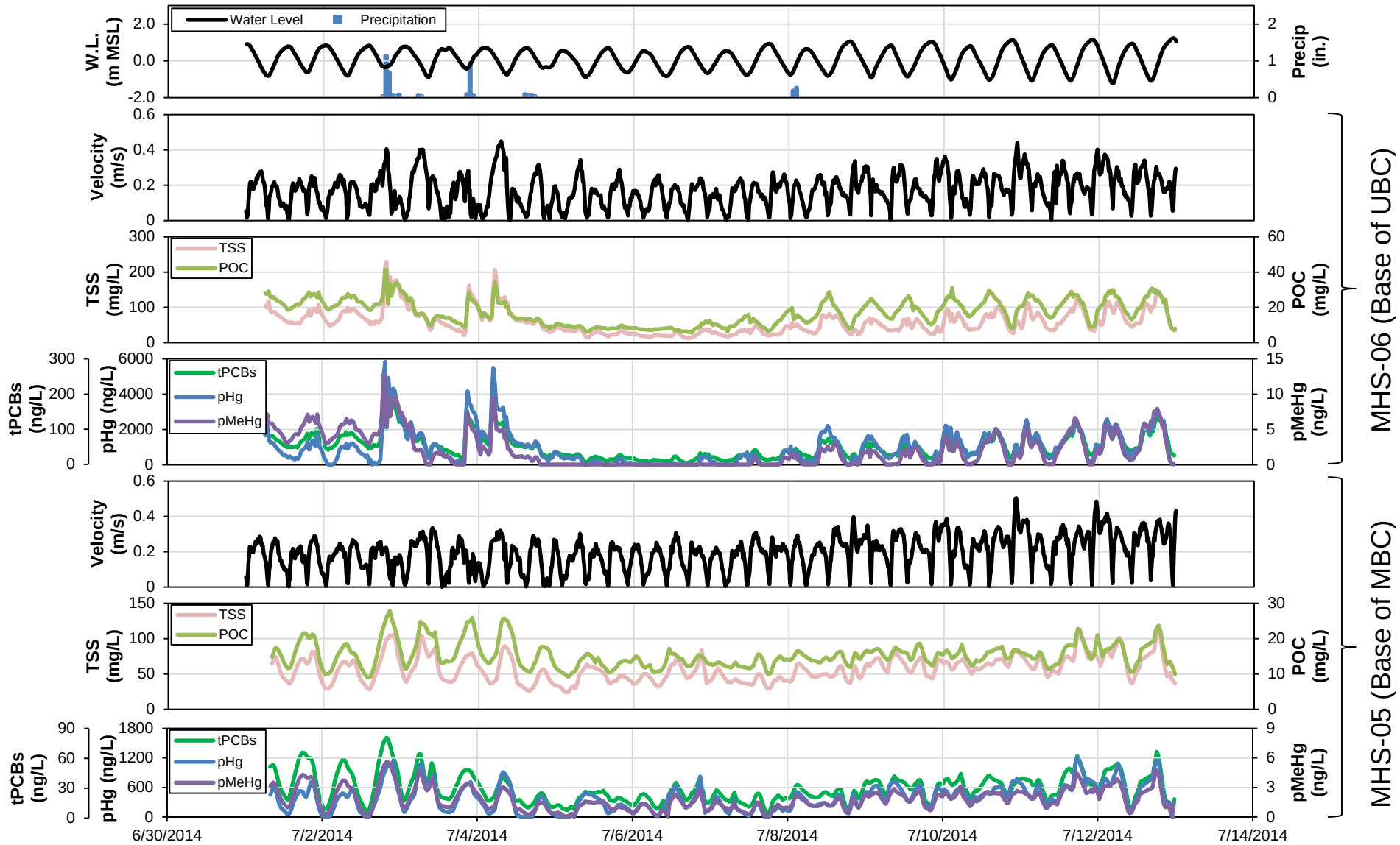
DRAFT

Surface Sediment COPC Concentrations in Berry's Creek Study Area: Methyl Mercury

Berry's Creek Study Area Remedial Investigation

Figure **5-3**

N:\GIS\Projects\C1030_RIFS_BCSA\Production_MXDs\RI_Report\Appendix F_Sediment\Figure_3_14a_MetHg_Map_surface_sed_BCSA.mxd 6/28/2016 1:01:48 PM



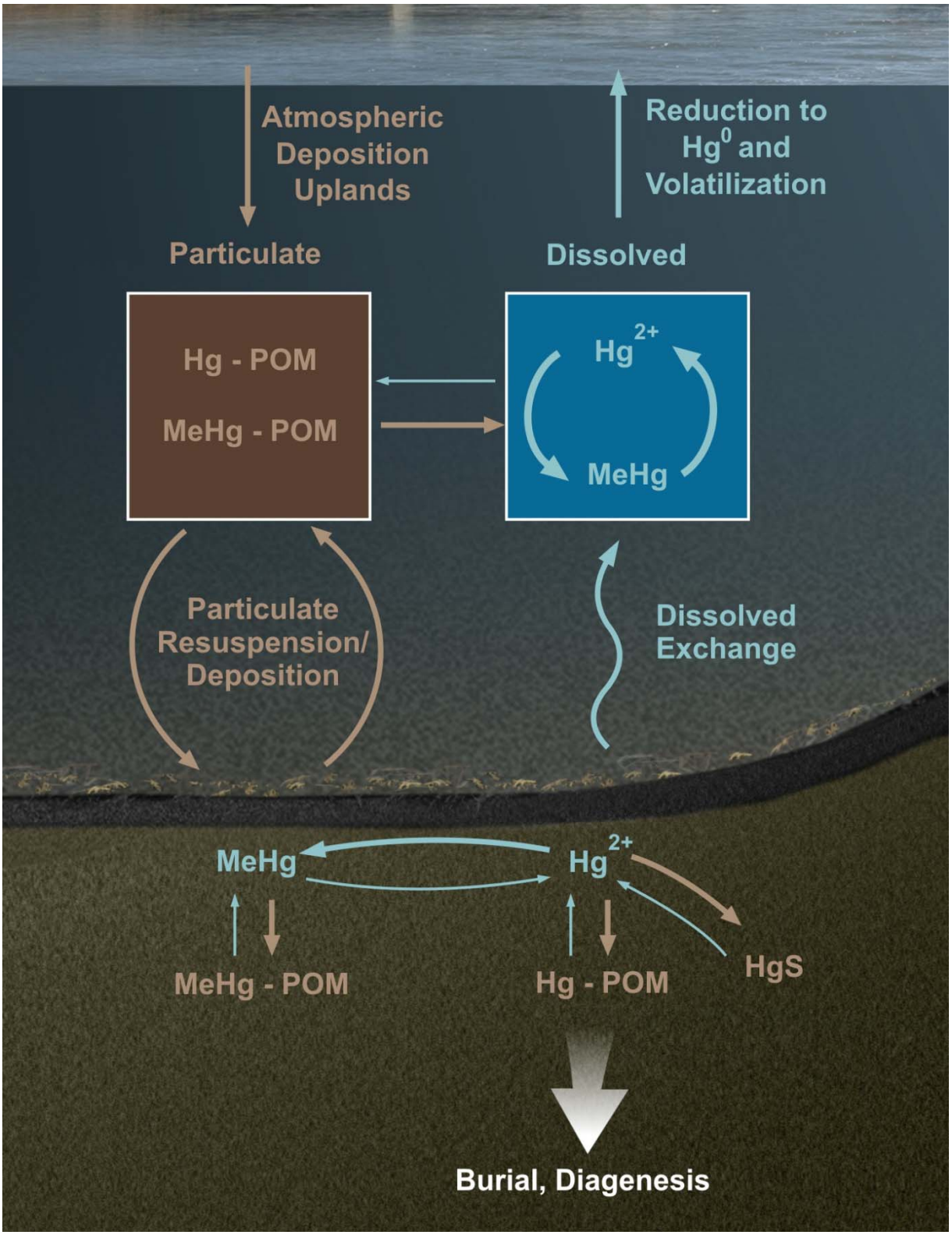
Notes:
Water levels measured at MHS-06.
Hourly precipitation data for Lyndhurst, NJ provided by the New Jersey Meadowlands Environmental Research Institute.
COPC = chemical of potential concern, p = particulate, POC = particulate organic carbon, t = total, TSS = total suspended solids

DRAFT

Measured Velocity, Calculated TSS, and Model-Predicted POC and Particulate COPC Concentrations During the 2014 Optically-Based Monitoring Study

Berry's Creek Study Area Remedial Investigation

Figure **5-4**



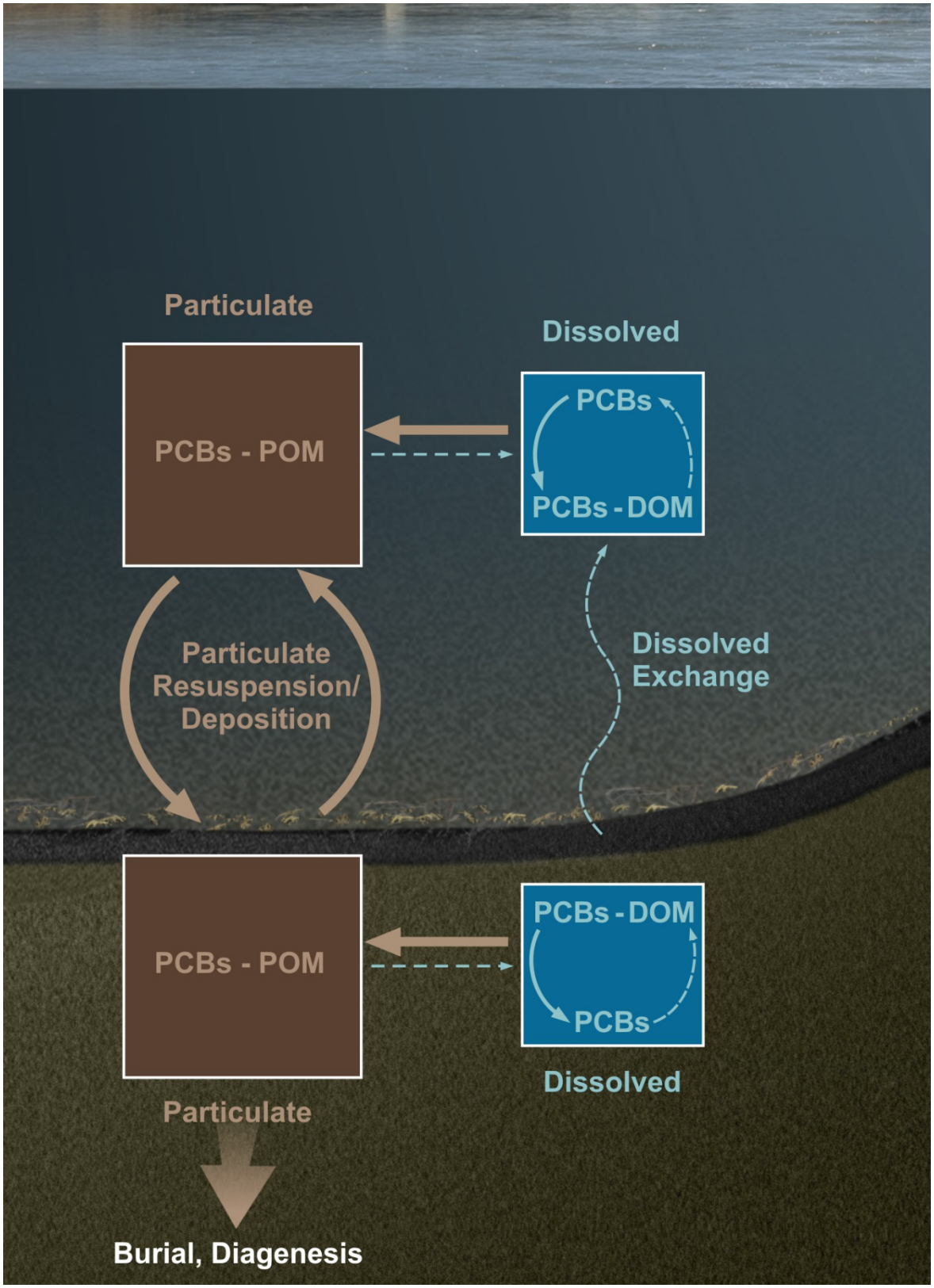
Notes:
POM = Particulate Organic Matter
Brown arrows indicate particulate processes.
Blue arrows indicate aqueous processes

DRAFT

Conceptual Schematic of Mercury and Methyl Mercury Cycling in BCSA Sediment and Surface Water

Berry's Creek Study Area Remedial Investigation

Figure 6-1



Notes:
POM = Particulate Organic Matter
Brown arrows indicate particulate processes.
Blue arrows indicate aqueous processes

DRAFT

Conceptual Schematic of PCBs Cycling in BCSA Sediment and Surface Water

Berry's Creek Study Area Remedial Investigation

Figure 6-2