ATTACHMENT E

2010 MARINE SURVEY SUMMARY REPORT

Champlain Hudson Power Express Project

Attachment E

Marine Route Survey Report

July 2010

TABLE OF CONTENTS

SECTION NO. **PAGE NO.**

LIST OF TABLES

LIST OF APPENDICES

Appendix B of the Marine Survey Report contains Confidential Information and filed with the Public Service Commission Administrative Law Judges pursuant to New York's Freedom of Information Law and 16 N.Y.C.R.R. § 6-1.4.

Part I (Confidential - ALL)
Geophysical Survey: Lake Champlain and Champlain Canal
Landfall Surveys

Part II (Confidential - ALL)
Geophysical Survey: Hudson River
Sediment Survey: Lake Champlain, Champlain Canal and Hudson River
Benthic Survey: Lake Champlain and Champlain Canal

Part III (Confidential – Geophysical Survey ONLY)
Geophysical Survey: Harlem River, East River and Long Island Sound
Sediment Survey: Harlem River, East River and Long Island Sound
Benthic Survey: Harlem River, East River and Long Island Sound

1.0 INTRODUCTION

Subsequent to the start of the Marine Route Survey, there were some modifications to the proposed Champlain Hudson Power Express (CHPE) project route as described below; however the marine route survey was conducted along the original Project route. The marine route survey field effort was conducted in the Spring of 2010 with final technical reports delivered by mid-June. As a result, these reports discuss two bi-poles with one bi-pole delivering power to Bridgeport, Connecticut, rather than the current Project configuration of a single bi-pole to the New York City metropolitan area. The text of the reports remains the same but for ease of review drawings19 through 75 of the OSI report were removed as they cover an area that is no longer part of the Project.

Champlain Hudson Power Express Inc (CHPEI) a subsidiary of Transmission Developers Inc (TDI) proposes to develop the Champlain Hudson Power Express Project (Project) to connect renewable sources of power generation to load centers in and around the New York City. The Project will include underwater and underground, high-voltage direct current (HVDC) transmission cables connecting HVDC converter stations in Canada with a HVDC converter station in Yonkers or Astoria, New York. To the extent possible, CHPEI proposes to install the transmission cables along and within existing waterways to minimize land use and visual impacts typically associated with traditional overhead transmission lines, while simultaneously providing the additional capacity required to meet the increasing clean energy demands of the greater New York City metropolitan area. The Project consists of a 1,000 megawatt (MW) HVDC underwater/underground HVDC transmission system that includes one 1,000 MW bipole (a bipole includes two cables connected as a bipole pair), extending between the Canadian border and New York City, New York. CHPEI has designed the Project to meet the New York City area's need for additional sources of competitively priced electricity from safe and reliable renewable sources of energy.

The proposed transmission cable route corridor was developed to avoid and minimize potential environmental impacts and along favorable conditions for the installation of the cable. The selection of the proposed cable corridor and route took into consideration water depths, geology, contaminated sediments, fishing activities, restricted areas, environmentally sensitive areas, cultural resources and physical obstacles. In order to resolve data gaps and to further refine the underwater transmission cable route, a Marine Route Survey was conducted for a 300' wide corridor during spring 2010. The Marine Route Survey included geophysical, sediment and benthic surveys:

- Geophysical surveys were conducted to investigate existing bottom features in the lakes, rivers and canals along the proposed route. Surveys were conducted using multi-beam bathymetry, side-scan sonar, magnetometer and sub-bottom profile.

- The sediment survey was conducted to collect information on the existing sediment type and quality along the proposed route.

- The benthic survey was conducted to augment existing benthic community data and will be used to assess potential impacts associated with the installation of the underwater transmission cable.

CHPEI filed an Application for Certificate of Environmental Capacity and Public Need on March 30, 2010 ("Application") with the New York State Public Service Commission. The Marine Route Survey data supplements the data discussed in Sections 4.6 and 4.7 of the Application.

Marine Survey results have not changed the overall assessment of impacts provided in the Application. Results have allowed further revisions to route corridor and have provided data on cultural resources, which is currently being evaluated. The data from the spring 2010 Marine Route Survey is summarized in the following sections.

Appendix B of this report contains Confidential Information and filed with the Public Service Commission Chief Administrative Law Judge pursuant to New York's Freedom of Information Law and 16 N.Y.C.R.R. § 6-1.4.

2.0 PHYSICAL AND CHEMICAL CHARACTERISTICS OF MAJOR AQUATIC SYSTEMS SEDIMENT SAMPLING

2.1 Geophysical Survey

Geophysical surveys were conducted to investigate the existing bottom features in lakes, rivers and canals along the proposed underwater transmission cable route. Surveys were conducted using multi-beam bathymetry, side-scan sonar, magnetometer and sub-bottom profile. The sections below provide a description of the proposed underwater transmission cable route from North to South, beginning at the Canadian/US border in Lake Champlain, and ending in the East River, New York. As detailed in the attached drawings, all depths are relative to North American Vertical Datum of 1988 (NAVD88), unless otherwise stated. Side-scan sonar targets are denoted by "SS", preceded by the abbreviation of the waterbody it is located in (e.g., Hudson River = HR). Similar nomenclature is used for magnetic targets, these are denoted as "Mag" and preceded by the abbreviation of the waterbody. Detailed drawings of the geophysical survey which include bathymetric data, magnetometer targets, side-scan sonar mosaic and sub-bottom profiles can be found in Appendix B Parts I-III.

2.1.1 Methods

Due to project schedule and size, the proposed route was divided up by waterbody and three marine surveyors conducted the geophysical survey for the Champlain Hudson Power Express Project: Rogers Surveying LLC (Rogers), Alpine Ocean Seismic Survey (Alpine) and Ocean Surveys Inc (OSI). Lake Champlain and Champlain Canal were surveyed by Rogers. Alpine conducted the survey in the Hudson River and OSI surveyed Harlem River, East River and Longs Island Sound.

Detailed methods and equipment used to conduct each portion of the geophysical survey along the proposed underwater transmission cable route can be found in the individual marine surveyor technical reports in Appendix B Parts I - III.

2.1.2 Existing Conditions

2.1.2.1 Lake Champlain

Lake Champlain is a large freshwater lake at the northeast corner of New York State. Most of the lake length forms the border between New York and Vermont, and the northernmost end extends into Canada. For the purpose of describing bathymetric features within Lake Champlain, it has been split into three sections.

North Basin, Lake Champlain (Charts 1-28 -** Appendix B Part I**)

The north basin segment of the Lake Champlain portion of the proposed route extends from the Canadian border south to the southern end of Grand Isle at Mile Post (MP) MP 29. Water depths through this portion of the route vary widely, ranging from approximately 16 ft. (ft.) deep near the Canadian border to almost 240 ft. deep near the southern end of Grand Isle.

Surficial sediments along this portion of the route appear to be fine grained. Rocky areas and obstructions occur in several locations. Two rocky areas are associated with bridges, occur within 1.5 miles of the Canadian border Station Number (STA) 43+00 and 63+00), the bridge located at STA 63+00 is an abandoned railroad trestle. At approximately STA 139+00 the proposed centerline crosses over a rocky area likely associated with a jetty at Stony Point, east of this area the lake bottom appears smooth.

Rapid changes in depth occur periodically south of MP 11, near the north end of Monty Bay (MP 11). The first change occurs just south of MP 11, between STA 594+00 and 598+00, where depths increase (i.e., deeper) by 10 ft. and then rapidly decrease (i.e., shallower) by 23 ft. at STA 598+00. In addition, there is no sub-bottom penetration at this location during the sub-bottom profile possibly indicating rock.

Near the northern tip of Point Auroche depths increase 15 ft. between STA 736+00 and STA 738+00 then continue gradually increasing an additional 40 ft. to STA 782+00. South of this, between STA 828+00 and 838+00 depths increase again by an additional 40 ft. Near the center of Treadwell Bay depths decrease 40 ft. between STA 1030+00 and 1046+00, then increase by approximately 110 ft. to STA 1114+00. Depths remain relatively consistent from STA 1114+00 to STA 1414+00 then gradually decrease by nearly 80 ft. to STA 1462+00.

Multiple side-scan sonar targets occur in the northern portion of the route, beginning at approximately STA 20+00 with anomalies at the foot of Fort Montgomery (LCSS638, 637 and LCMag7, 6). At approximately STA: 45+00 there are what appears to be two old bridge footings just north of the two existing footings from the Route 2 Bridge; all seen in LCSS633-636. These anomalies were also found during the magnetometer survey. Within this portion of the proposed underwater transmission cable route, there are several utility crossings (STA 1235+00 (LCSS579-584), STA 1237+00 and 1240+00 (LCSS576, 577 and LCMag42) and (LCSS574, 5755 and LCMag48).

Sub-bottom profile surveys revealed a layer of "soft" sediments as there was deep sub-bottom penetration along the majority of the proposed route. Penetration was greater than 80 ft. below the surface in some locations, and was greater than 10 ft. throughout most of the route. Sub-bottom penetration was less than 5 ft. or not possible in some localized areas indicating bedrock or compacted sediments.

South Basin, Lake Champlain (Charts 28-69** - *Appendix B Part I)**

The south basin segment of Lake Champlain is 45 miles long. The proposed route is situated between the southern end of Grand Isle (MP 29) and Crown Point (MP 74), just south of Port Henry, NY. This section contains some of the deepest areas of along the entire project route, with water depths increasing to as much as nearly 400 ft. (depth in relation to water level).

Overall, surficial features between Grand Isle and Crown Point are relatively smooth, although there were many large bathymetric features observed, causing abrupt changes in water depths over relatively short distances. For example, between STA 2004+00 and STA 2040+00 water depths decrease by nearly 60 ft. likely due to a rock outcrop. Just south of the rock outcrop, water depths increase by 140 ft. down a steep slope. The bottom features between MP 40 and MP 47 were variable, with many steep slopes and depth changes, before the route elevation drops into the deepest area of Lake Champlain; extending from Willsboro (near MP 48) to north of Diamond Island (MP 56), water depths are close to 400 ft. In this area there are mostly smooth transitions in elevation, except where the route passes close to Split Rock Point (at STA 2914+00). At this point the water depth decreases by nearly 60 ft. as the route runs along the steep slope of a rock outcrop west of the centerline. In the area around Diamond Island, depths begin to gradually decrease, to water depths of +70 ft. (relative to NAVD88) south of Crown Point (MP 74)).

Few side scan targets were identified in this segment. Several rocks and debris exist between STA 2575+00 and STA 2600+00 near the proposed centerline. The footing of the former Crown Point Bridge is located approximately 50 ft. west of the centerline at 3895+00 (LCSS483).

The sub-bottom profiles showed deep penetration throughout the southern Lake Champlain section. Along the deepest sections, sub-bottom penetration was possible to 80 ft. under the surficial substrate. Some possible rock outcrops restricted penetration in isolated areas, (between STA 2010+00 and STA 2028+00, STA 2436+00, STA 2452+00, STA 2914+00). There was also a short section under the former Crown Point Bridge where penetration could not be achieved by the sub-bottom profiler (STA 3892+00 to STA 3898+00).

South Lake Champlain (Charts 69-105** - Appendix B Part I**)

The South Lake Champlain section is 36 miles long. The proposed route is situated between Crown Point (MP 74) and Whitehall (approximately MP 110). Water depths along this portion of the route are generally less than 20 ft. and surficial sediments along this portion of the route are relatively fine grained, with some areas containing course grain surficial sediments and larger materials (specifically in the southern half of this stretch). Between Crown Point and Whitehall, , three rapid changes in depth occur. Between STA 4194+00 and 4198+00 depths increase by approximately 25 ft., then gradually decrease. The proposed centerline passes through a 10 ft. deep "hole" near STA 4860+00, but west of the "hole" remains level. Another steep slope occurs near MP 100, where the proposed centerline approaches a rocky point, however water depths and surficial sediments are consistent east of the rocky point, more toward the center of the waterbody.

The proposed route centerline passes over several obstructions and possible cultural targets. A sewer pipe is crossed at STA 4320+00 (LCSS451, 452, and LCMag 60D) while bottom scars and an associated magnetic target are located south at STA 4595+00 (LCSS420 and LCMag 62). Another possible cable is crossed near Larabees Point (STA 4600+00), and immediately south the proposed route also passes through several old pilings STA 4630+00. Fourteen additional side-scan targets and LCMag 66 are located between STA 4625+00 and STA 4630+00. At STA 4673+00, five side scan targets and LCSS396-400 mark the Fort Ticonderoga Great Bridge Caissons. There are no magnetic anomalies in this area.

Sub-bottom profiles along this portion of the route show limited penetration, with penetration of 2 to 3 ft. along the majority of the route. However, sediment coring in this area was able to penetrate as deep as 10 ft. This area may be investigated further in order to determine if the bottom is composed of compact, coarse sediments, bedrock or organic-rich sediments. Based on the results of the additional investigation, cable installation methodology may be refined.

2.1.2.2 Champlain Canal

The Champlain Canal portion of the proposed alternative route extends from Whitehall, NY to Hudson Falls, NY. This portion of the route is broken into three different sections in accordance with each landfall around the locks. The Champlain Canal, for the most part, is relatively narrow at approximately 120 ft. wide and with a 12-foot deep channel in the center. The banks of the Champlain Canal are variably constructed of mud, stone, rip-rap, and grass. Many small creeks and tributaries also feed into the canal. Most of the debris observed in the canal consisted of tree limbs, while dredge scars were observed throughout the canal. There are frequent magnetic targets as well, but these may be a result of the magnetic sensors being in relatively close proximity (i.e., shallow water) to debris on the banks. In many long stretches of the canal, sub-bottom penetration was limited to less than 5 ft. This may be due to organic rich sediment at the surface. Throughout the canal, sediment core sampling achieved depth penetration greater than 10 ft.

Whitehall, NY to Comstock, NY (Charts 01 to 09 - *Appendix B Part I)*

Depths along this portion of the proposed alternative route are generally consistent, though a few deeper holes were located. Surficial sediments consist mainly of fine grained materials (i.e., silts/clays).

Just south of the cable landfall transition areas, a cluster of side-scan targets were identified. These targets appear to be debris and occur between STA 05+00 and 25+00. No magnetic targets were encountered in this vicinity. This portion of the proposed route encounters one bridge crossing, Ryder Road at STA 240+63.

Sub-bottom penetration was variable along this portion of the route, but little (less than 3 ft.), or no penetration was observed along the majority of the route. Sub-bottom penetration occurred only in the first 200 ft. of the proposed route, then again from STA 86+00 to 130+00.

Comstock, NY to Fort Ann, NY (Charts 1-6 - *Appendix B Part I)*

No significant changes in depth occurred in this portion of the canal. Surficial sediments in this portion of the canal ranged from fine to medium grained.

Most side scan targets within this section are from tree debris. In the northern area of this portion of the route, and on the east side of the canal, there are many small piles, to restrict boaters from gaining access to the dam side of the lock. Many of these piles appear on drawings as side-scan sonar targets. There are five bridges along this portion of the route; Route 22, at STA 35+37, Deweys Bridge Road, at STA 115+49, Ann Street, at STA 249+69, Baldwin Corners Road, at STA 336+16, and Route 149, at STA 455+91.

Sub-bottom penetration was greater than 20 ft. over the majority of the route, with limited or no penetration from STA 37+00 to 35+00, and STA 265+00 to 271+00.

Fort Ann, NY to Hudson, Falls NY (Charts 1-3- *Appendix B Part I)*

This is the shortest stretch of the proposed alternative route in the Champlain Canal, comprising less than 3 miles. No rapid changes in depth occur along this portion of the route, and substrate is composed primarily of fine grained sediments. Tree debris located at approximately STA 82+00 (CCSS798), 50 ft. west of the proposed centerline, are the only significant side-scan sonar targets in this portion of the canal. No notable magnetic targets were located.

Deep penetration (greater than 20 ft.) occurred from STA 21+00 to STA 37+00, and from STA 64+00 to STA 94+00. There were some areas where no penetration was achieved by the sub-bottom profiler.

2.1.2.3 Hudson River

In the following sections the Hudson River has been broken up into several segments related to changes in geology and morphology. These segments were based on Hudson River descriptions by Nitsche et al (2006). The MP are based on marine route survey segments for cable installation.

***Albany/Troy (Hudson River Charts 1-5-** *Appendix B Part II)*

The Albany/Troy portion of the proposed route is the shortest section within the Hudson River, it includes 5 miles from the Coxsackie landfall (MP 0.0) to MP 5.0 near New Baltimore.

Surficial sediments are mostly uniform, with possible sediment waves appearing between MP 4.0 and MP 5.0. This area may be investigated further to determine the extent of the sediment waves. For this section the proposed cable route is adjacent to and crosses the existing navigation channel.

Most side scan sonar targets identified within the proposed route are likely associated with adjacent buoys (HRSS158, 161 and 162). One cylindrical target (HRSS163) was identified with a corresponding magnetic target, and is located near STA 5+000.

For much of this section, there was little or no sub-bottom penetration with the sub-bottom profiler. However, where penetration was obtained, it was generally 5 ft. or greater (STA 20+000 to STA 21+000), and at least 5 ft. of sediment was recovered at all coring locations (See Section 2.4.2.3).

***Catskills (Hudson River Charts 5-63-** *Appendix B Part II)*

The Catskill section of the Hudson River extends from New Baltimore at MP 5.0 to Kingston at MP 46.0, and represents the longest section of river within the proposed route within the Hudson River. It is further divided into the Northern Catskills (MP 5.0 – 26.0) and Southern Catskills (MP 26.0 – 46.0) sections.

The majority of the cable route in this section is located just outside the navigation channel, with periodic channel crossings. The water depths in this area ranged from slightly less than 10 ft. to approximately 50 ft., relative to the NAVD88 vertical datum.

***Northern Catskills (Hudson River Charts 5-25-** *Appendix B Part II)*

The Northern Catskills portion of the proposed route extends from MP 5.0 to MP 26.0. Bottom contours were relatively uniform in many areas, changing less than 10 ft. for 3 miles (MP 14 to MP 17). However, in areas where the route crosses the channel or comes close to shore, elevation changes did occur. Just south of Houghtaling Island, at STA 32+000, an outcrop resulted in a depth decrease of approximately 15 ft. This outcrop was isolated, and the area to the east or west may have a less severe elevation change. At STA 37+500, the centerline passed near a steep elevation change of what appeared to be rock. The bottom around Coxsackie Creek (STA 42+000 to 44+000) was not uniform, with bathymetry increasing and decreasing upwards of 20 ft. in a short distance. The river bottom east of the proposed route at this location was more uniform. Several depth changes occurred between STA 58+400 and 62+000, followed by intermittent 6-foot. sediment waves until STA 88+000. At the southern end of Middle Ground Flats (STA 100+000) the proposed centerline crosses an area with abrupt changes in depth, dropping from approximately 15 ft. to nearly 50 ft. across a 400 ft. stretch. The area between MP 20.0 and MP 24.0 varied greatly in bottom depth, from nearly 70 ft. to 18 ft., including several steep changes associated with crossing the channel.

There are two places where the proposed route passes near fixed navigation towers located in the river, just outside the main channel. One location is the lighthouse at the south end of Middle Ground Flats (STA 100+000), between Hudson and Athens, NY. Another is marker 169, just north of Coxsackie Creek on the west bank of the river (STA 42+000 to STA 43+000) where there is less than 5 ft. of water on the inshore side of these structures.

There are several side scan sonar targets in this section of the river. Side scan sonar revealed an unknown target (HRSS154) along the centerline at STA 56+600. No magnetic anomaly is associated directly with this target, though several magnetic targets are located nearby. A large debris field was located approximately 50 ft. east of STA 92+500.

At STA 101+000 and STA 103+000, the proposed route crosses two possible cable crossings (HRSS142 and 143). No magnetic targets are associated with the potential cable at STA 101+000, but the target at STA 103+000 is close to magnetic target HRM156. The NOAA chart displays several marked pipelines and cable crossing areas in this section. Most of these marked areas cross the river between Athens, NY and Hudson, NY (MP 18.5 to 19.5). Near STA 111+000, on the west side of the route, an obstacle identified as the corner of a man-made pier extends into the river. This pier corner lies within 150 ft. of the proposed cable route. At STA 116+600, less than 200 ft. west of the centerline, the proposed route passes the supports for the Rip Van Winkle Bridge. At STA 135+800, on the west side of the proposed route, an obstacle (HRSS132) with no associated magnetic target is located at a distance approximately 100 ft. from the proposed centerline.

For much of this section, sub-bottom penetration could not be obtained, or was very limited. However, where penetration was obtained, it was generally deeper than or approximately 5 ft. At least 5 ft. of sediment was recovered at all core locations (See Section 2.4.2.3).

***Southern Catskills (Hudson River Charts 25-43-** Appendix B Part II)*

The Southern Catskills portion of the proposed route extends from MP 26.0 to MP 46.0. Water depths along this section ranged from approximately 20 ft. to 80 ft., but generally lack any steep gradients. The only notable depth change occurs just south of Esopus Creek between STA 181+000 and 182+000 where water depths change from approximately 55 ft. to 78 ft. (relative to NAVD88).

Sediment waves dominate the majority of this portion of the proposed route, extending for several miles. Sediment waves ranging between 2 and 5 ft. tall extend from MP 26.0 to just south of MP 27.0. Sediment waves 2 to 3 ft. tall also exist between MP 30.0 and MP 33.0, and occur occasionally between MP 37.0 and MP 40.0. Sediment waves, up to approximately 6 ft. tall, exist between STA 187+500 and 193+000.

At STA 182+600 an unknown side scan sonar target (HRSS128) with an associated magnetic target is located approximately 80 ft. east of the proposed centerline. At STA 190+900, a linear target is located about 100 ft. east of route. The target has a low height, and may be a sunken piling. At STA 192+000, a small obstacle, about 2 ft. high with associated debris, is located at a distance of less than 100 ft. east of the proposed centerline. An unidentified linear object, with no magnetic target and no height is located at STA 234+400, between 150 and 180 ft. west of the proposed centerline.

For most of this section, sub-bottom penetration was very limited. Penetration along the majority of the proposed route was generally below or approximately 5 ft. At least 5 ft. of sediment was recovered at all core locations. This area may be investigated further in order to determine if the bottom is composed of compact, coarse sediments, bedrock or organic-rich sediments. Based on the results of the additional investigation, cable installation method may be refined

Poughkeepsie (Hudson River Charts 43-63** - Appendix B Part II**)

The Poughkeepsie section of the proposed route is 21 miles long and runs from Kingston, NY at MP 46.0 to the entrance of the Newburgh Bay just south of Marlboro, NY at MP 67.0. The proposed route passes under two bridges in this section, the Mid-Hudson suspension bridge and the Walkway over the Hudson, a pedestrian bridge. The depth of this portion of the route varies drastically, ranging from approximately 8 ft. to 125 ft. (relative to NAVD88).

Most changes in substrate elevation are gradual; however, some steep gradients do occur. Near the Esopus Meadows Lighthouse, at STA 257+500, water depths increase from 70 ft. to 86 ft. At Crum Elbow (STA 293+000 to 300+000), the centerline runs along a steep slope, with water depths ranging from 50 ft. to over 120 ft. Between STA 304+000 and 306+000, the centerline drops from approximately 60 ft. to more than 115 ft. The bottom of this slope appears to be a rocky area. The centerline passes over this section of rock, but the area to the west appears clear of obstacles. In the area surrounding the Mid-Hudson Bridge in Poughkeepsie, NY (MP 60.0 to MP 62.0) there appears to be sand waves along the centerline, although the waves appear to be less than 2 ft. in height. Between Blue Point and Mine Point, at STA 327+500, the centerline passes close to a shallow rocky area to the west. The centerline also passes close to shore and over a rocky section at STA 345+500 before crossing over short(1 – 2 feet) sediment waves from STA 346+000 to 350+000.

Several side-scan sonar targets are located in this section of the route. At STA 315+500, there are two possible cables crossing the route (HRSS112 and 113) associated with HRMag345. Between STA 315+700 and STA 316+300, there are several pieces of debris and the pylon for the Walkway over the Hudson. These are associated with several magnetic targets (HRMag346, 347, and 348). The bridge support lies within 100 ft. of the centerline. There is a possible cable crossing at STA 317+000, associated with HRMag351. At STA 319+300, there is an area of obstacles near HRMag352. At STA 348+500, there is a possible cable crossing (HRSS96) near HRMag358. Between STA 350+700 and 351+700, there are two cable crossings (HRSS94 and 95) with the southern one being near HRM360. At STA 353+500, there was a possible cable crossing, though no associated magnetic targets exist.

Sub-bottom penetration was very limited throughout this section, although the sediment cores were able to penetrate to depths of 20 ft. The profile did show very short sections where penetration was achieved to 5 ft. or more, from STA 346+000 to 351+000, and STA 318+700 to 326+700.

Newburgh Bay (Hudson River Charts 63-75 -** Appendix B Part II**)

Newburgh Bay is a wide section of river between the cities of Newburgh, NY and Beacon, NY, passing underneath the Newburgh-Beacon Bridge and then entering the Hudson Highlands. The proposed route along this section is between MP 67.0 and MP 80.0.

Depths in this section are fairly uniform, with gradual changes and no large areas of rock outcrop. There are apparent sediment waves in two areas along this section. The first area (STA 387+000 to 389+500) is just north of the Newburgh-Beacon Bridge, with waves no more than 2 to 3 ft. in height. The second is between STA 417+00 and 420+000, with smaller waves.

Side scan sonar identified numerous targets and several large debris fields along the route. At STA 359+500 there is a target on the proposed centerline, likely associated with the adjacent buoy. At STA 367+700 to 370+000 there is a cable and pipeline area identified on the NOAA chart, with many targets adjacent to and crossing the proposed route centerline. Between STA 373+700 and 374+000, there is a large debris field across the route, with no magnetic targets. Near STA 379+000 there is a long linear target (HRSS76) near the centerline. At MP 73.8, the route crosses under the Newburgh-Beacon Bridge, with a buttress located approximately 70 ft. east of the centerline. From STA 393+000 to 397+700 the centerline passes through a cable and pipeline area. There are many linear targets and magnetic anomalies within this area. Between STA 401+400 and 402+400, a large debris field lies across the route, with no magnetic targets. Lastly, two debris fields exist adjacent to the route centerline in the waters just off Pollepel Island. The first is between STA 410+000 and 410+300. The second, larger debris field stretches across the entire width of the route from STA 411+600 to 412+700.

Along most of the route, sub-bottom profiling was able to penetrate to depths of 5 ft. or more. In other areas of the route, multiple layers of sediments down to 15 ft. were observed.

Hudson Highlands (Hudson River Charts 75-92 - Appendix B Part II)

This is the deepest section along the route, as the Hudson River passes through a gorge between MP 80.0 and MP 96.0, from Storm King Mountain at the Northern end to the entrance of Haverstraw Bay. Water depths were as much as 160 ft. (relative to NAVD88) in the area between MP 82.0 and MP 84.0, adjacent to West Point.

The surficial riverbed is characterized by long sections of smooth, penetrable sediments with interspersed steep, rocky areas. In the deepest portions surrounding West Point, water depths range from 85 ft. to over 150 ft. in a short distance, with large peaks of rock outcrop (STA 434+000 to 442+000). This immediate area displays the most extreme changes in bathymetry in the Hudson River portion of the route. Further down, the route passes very close to a rocky shore at Con Hook (STA 456+000). The area to the east of the proposed route appears to be clear of obstacles. In some areas through this section, the bottom appears to be composed of rocks, but sub-bottom penetration was achieved to approximately 5 ft.

Within this section, some targets were picked up by the side scan sonar. At STA 449+900, there are unidentified targets (HRSS58, 59, and 116) on the east side of the route, with a magnetic target (HRMag349) just to the south. At STA 497+000, there is a linear target (HRSS51) crossing the route with no associated magnetic target. At STA 506+000, there is a possible cable crossing (HRSS50) but with no associated magnetic target. In addition, several magnetic targets were recorded in this area (HRM550, 551, and 552).

Sub-bottom penetration was achieved through much of this section, but was sometimes limited to less than 5 ft. In some areas, the bottom appeared to be smooth, but penetration could not be obtained (STA 423+000 to 433+600 and STA 443+700 to 454+700). However, more than 5 ft. of sediment was recovered at some coring sites (HR97, 99, 100, 101, 103) where no sub-bottom penetration was attained.

Tappan Zee/Haverstraw (Hudson River Charts 93-108 - Appendix B Part II)

There were very few elevation changes along this portion of the route. However, much of the route (MP 103.0 to MP 113.0) is characterized by sediment waves. Most of these waves are limited to less than 2 ft., but they do reach up to 4 or 5 ft. in certain areas (STA 547+700, and STA 555+500 to 557+000).

There are two debris fields between STA 512+000 and 513+400, with no magnetic targets. Between STA 569+000 and 570+000, there are two possible cables within a cable crossing zone, one associated with HRMag575. There is a linear target, possibly a piece of pipe, very close to the centerline at STA 579+100. The route passes underneath the Tappan Zee Bridge at STA 573+000, and a pylon associated with the bridge is 100 ft. from the centerline. At STA 593+600, there is a possible cable, near magnetic target HRM598.

Deep penetration was achieved with the sub-bottom profiler throughout this section. Typically, penetration was achieved to 5 ft. or more. One long section between STA 513+100 and 528+000 displayed little to no penetration. However, sediment coring (HR-104, HR-105, and HR-106) had the best penetration (19.6 ft.) and recovery (≥16 ft.) of the section.

***Palisades (Hudson River Charts 109-114 and Yonkers to Sherman Creek Charts 1-4** - Appendix B Part II)*

The Palisades portion of the proposed route starts at MP 113.0 and continues down the river to Spuyten Duyvil and the Harlem River. Please note that within this segment of the route, MPs change due to the landfall location at Yonkers. At this location, the route MPs are re-zeroed. Water depths ranged from approximately 65 ft. to 43 ft., but generally remained between 45 and 55 ft. for the majority of the route (relative to NAVD88). The only depth change greater than 20 ft. occurs between STA 597+000 and 599+000. The depth changes from approximately 65 ft. to 43 ft.

Sand waves were typical in large portions of the route. They are limited to 2 to 3 ft. in height and occur between STA 612+000 and 616+000, and for approximately the first mile south of landfall in Yonkers.

Between STA 600+300 and 601+000, there is a debris field to the east of the proposed route near shore. At STA 604+300, there is another small debris area just to the west of the proposed route near STA 604+300. Within 600 ft. of MP 115.0 there are two side scan sonar targets approximately 50 ft. west of the proposed route, one is a rectangular shaped object (HRSS22), and the other is unidentified (HRSS169). A linear shape side-scan sonar target, HRSS18, is located less than 50 ft. east of the proposed route at STA-617+000. A few side-scan targets exist between Yonkers and the Harlem River. Three cylindrical shape targets are located within 40 ft. of the proposed route at approximately STA 1+600, and STA 11+100, and STA 17+000. A small debris field is also identified in this stretch, at STA 3+700 (Yonkers Chart 1), and located approximately 100 ft. east of the proposed route. Another side-scan target, is located 100 ft. east of the proposed route, at STA 16+600 (HRSS01), and appears to be four circles arranged in a rectangle.

Sub-bottom penetration reached up to 25 ft. below the surface in some locations, but remained approximately 15 ft. below the surface for the majority of the route. From STA 13+000 to 18+000 sub-surface penetration did not occur, with the exception of a few isolated locations.

2.1.2.4 Harlem River and East River

As noted in the introduction, the marine route survey field effort was conducted in the Spring of 2010 with final technical reports delivered by mid-June. As a result, these reports discuss two bi-poles with one bi-pole delivering power to Bridgeport, Connecticut, rather than the current Project configuration of a single bi-pole to the New York City metropolitan area. The text of the reports remains the same but for ease of review drawings 19 through 75 of the OSI report were removed as they cover an area that is no longer part of the Project.

Harlem River (Sherman Creek Charts 1-10 -** Appendix B Part III**)

This portion of the proposed route runs from the confluence of the Hudson and Harlem Rivers, to where the Harlem River enters the East River at Hell Gate. Much of the riverbed bathymetry is quite variable along the proposed centerline. Water depths range from less than 10 ft. to more than 50 ft. at the intersection of the East and Harlem Rivers. Debris areas and rock outcrops are common features on the riverbed, often exceeding 10 ft. of relief or more. The riverbed becomes more regular south of MP 5.0 to the intersection with the East River.

Several areas were identified that have a steep change in elevation. These included the area just east of the Spuyten Duyvil Swing Bridge (STA 246+00), two large depressions at STA 78+00 and STA 82+00, and a steep drop where the Harlem River meets the East River (STA 310+00). Sediment waves stretch from STA 336+00 to STA 350+00 and STA 84+00 to STA 102+00.

Surficial sediments appear to be composed of a wide range of materials. Interpretation of bottom types can be difficult, especially in the Harlem River. Often the bottom appears covered with coarse material/debris, and several rock outcrops exist in the riverbed between STA 30+00 – 36+00 (Harlem River - Chart 4) and between STA 72+00 – 85+00. Finer sediments seem to dominate the lower section of the Harlem River (STA 270+00 – 310+00), as can be seen on the side-scan sonar mosaic.

Numerous acoustic targets and magnetic anomalies were detected along the length of the Harlem River. Many of the targets and anomalies were due to debris on the river bottom, numerous utility crossings and large structures in and around the area (bridges, tunnels, buildings, utilities). Debris on the river bottom can include a wide variety of material, from tires, riprap and timbers to sunken vehicles. Due to the sheer abundance of objects identified and the impracticality of mapping each small feature, many “debris areas” were mapped on the project drawings. Larger features were mapped with a unique target number, notably HARSS249, HARSS253, and HARSS249-251, which are linear objects near the centerline. Several “Unknown Crossing” areas that are potential large utility or tunnel crossings bypass the proposed route in the Harlem River. Two of these cross roughly perpendicular to the course of the river, the first near STA 125+50 and the second near STA 166+30. The third crossing is near STA 202+00 and crosses the Harlem River along a NE-SW orientation. These unknown crossings may represent fairly modern structural installations as the bottom appears recently disturbed.

Many man-made features are located along the Harlem River section of the route. Approximately 13 bridges cross the river, often adjacent to charted cable and pipeline areas. From north to south the major bridge crossings include: Spuyten Duyvil Swing Bridge (cable area), Henry Hudson Fixed Bridge, Broadway Lift Bridge (cable and pipeline area), 207th Street Swing Bridge (cable and pipeline area), Washington Bridge and High Bridge, Macombs Dam Bridge (cable area), 145th Street Bridge (cable and pipeline area), 138th Street Bridge, Park Ave. RR Bridge, Third Ave. Bridge (cable and pipeline area), Willis Ave. Bridge, Robert F. Kennedy (formerly Triborough) Bridge and Ward’s Island Bridge. Additional cable and pipeline areas intersecting the survey corridor are mapped on the project drawings. It should be noted that tunnels do exist below the Harlem River connecting Manhattan and Bronx, the locations of which were not apparent in the acquired data sets.

Subsurface penetration was achieved along much of the Harlem River section. In some areas penetration was achieved allowing for the mapping of well-layered unconsolidated sediments (i.e., near the Sherman Creek landfall). In these areas, penetration was typically 5 ft. or greater. However, penetration was also broken up by sections of apparent rock outcrops. In many areas penetration was restricted completely (STA 130+00 to STA 258+00); it is unclear if this is because the bottom is composed of compact, coarse sediments, bedrock or even organic-rich sediments present at or near the riverbed. In the area just north of Hell Gate (STA 270+00 to STA 310+00), penetration was restricted to 2-3 ft. by organic-rich sediments near the riverbed. In this case sub-bottom information indicated that unconsolidated sediments occupy the subsurface above the organic-rich surface.

East River (Sherman Creek Charts 10-18** - *Appendix B Part III)

The East River section of the proposed route extends nearly 9 miles, from Hell Gate to the Throgs Neck Bridge. Water depths range from approximately 15 ft. to greater than 127 ft. (relative to NAVD88) in a depression near Hell Gate. The riverbed along this section displays the most irregular and jagged bottom bathymetry along the proposed route, in particular between Hell Gate and Rikers Island.

Areas of extreme bathymetric change included a rocky trench, 40 ft. deep, at Hell Gate (STA 348+00), followed by rocky outcrops to STA 398+00. There are also large rock outcrops between STA 502+00 and STA 520+00, and also between STA 460+00 and STA 470+00. Finally, just east of the Throgs Neck Bridge there is a 40 ft. drop (STA772+00 – STA 776+00).

Surficial features in the East River appear to be less variable than observed in the Harlem River. Based on the high acoustic reflectivity and extreme irregularity of the riverbed along this section, it is apparent that exposed bedrock characterizes the riverbed here. This is expected as the tidal current in the East River and Hell Gate is exceptionally high. Scattered patches of coarse material and/or debris continue eastward along the East River between MP 10.0 and MP 11.0, and between MP 12.0 and MP 13.0. Coarse material became less frequent from MP 13.0 to the end of the East River at the entrance to Long Island Sound, except for the immediate area around the Throgs Neck Bridge.

Numerous side-scan sonar targets exist along the East River section between Hell Gate and Rikers Island, many likely represent bottom morphology and geology (i.e., rock peaks) and may not represent man-made objects. The extreme ruggedness of the bottom made detecting an obstruction difficult. Areas of debris were identified in the East River, but not to the extent as in the Harlem River. Side scan sonar identified many small objects, debris piles, and rock outcrops located near the centerline throughout the East River, notably ERSS163, ERSS128, and ERSS65-67. Far fewer magnetic anomalies were observed in the East River than in the Harlem River, as the East River is much wider and the magnetometer was less influenced by nearby structures. The East River still passes through urbanized areas and numerous acoustic targets and anomalies were detected with the same sort of debris, utilities, bridge and tunnel crossing signatures as in the Harlem River. Several linear features with magnetic anomalies exist between MP 8.0 and MP 9.0 in a charted cable and pipeline area, and are likely cables or pipelines exposed on the riverbed. Another potential cable or pipeline crossed the route near STA 510+00, in a charted cable and pipeline area. Linear features occur on the bottom (ERSS92 & ERSS93) and with an associated magnetic anomaly (ERM792). Potential cables or pipes with corresponding magnetic anomalies are on the centerline near STA 417+00 (ERSS148, 149, and 154). Another linear feature exists observed near STA 505+70 (ERSS261), with 2 magnetic targets nearby.

Due to the abundance of potential cultural targets and other obstructions detected near the proposed centerline in this area, additional survey lines were run offset to the south from the survey corridor to extend data coverage near these obstacles.

Several bridges cross the East River along this section of the proposed route, from west to east they are: Robert F. Kennedy Bridge and Amtrak Bridge (Hell Gate), Whitestone Bridge and the Throgs Neck Bridge. The route also approaches a modern charted pipeline, north of the survey corridor near STA 600+00 and higher.

Sub-bottom penetration was restricted below the riverbed along the majority of the East River section of the route. Restricted penetration was either caused by the presence of bedrock at or near the riverbed surface, or by the presence of shallow organic-rich sediments. There were large areas where no penetration could be achieved between Hell Gate and Rikers Island, and near the Whitestone Bridge (MP 12.0 to MP 13.0). Organic-rich sediments were observed at depths of 10 - 20 ft. below the riverbed in localized areas between Rikers Island and Throgs Neck (STA 702+00 to STA 766+00), suggesting material above this layer is unconsolidated. Subbottom penetration was not achieved near the Throgs Neck Bridge, possibly due to bedrock near the surface as coarse material was observed on the riverbed here; however, it is difficult to distinguish rocks/boulders from debris in this area.

Located within the East River, the Poletti Power Plant landfall option (Chart 76) is a relatively short segment, slightly less than 700 ft. Water depths range from approximately 12 ft. adjacent to the landfall bulkhead to greater than 80 ft. (relative to NAVD88) in a steep channel that traverses the corridor. The riverbed approaching the bulkhead appears to be rocky, composed of bedrock or coarse cobbles and boulders that prevented sub-bottom penetration. Side-scan sonar revealed two targets within this section. PSS1 appears to be a sunken barge charted by NOAA and PSS2 appears to be debris associated with the barge. These targets are located approximately 100 ft. south of the landfall centerline.

2.2 Summary

Lake, canal and river bottom morphology and topography (i.e., bathymetry and existing features) are important factors to consider during underwater cable laying and burial. Steep or abrupt changes in bathymetry can exacerbate cable installation issues and engineering costs. In addition, extreme changes in bathymetry can affect underwater cable design and life-span performance. The Marine Route Survey identified several areas along the proposed underwater transmission cable route which will need to be investigated further for potential re-routing in order to avoid abrupt changes in bathymetry and existing bottom formations such as bed forms or waves in the Hudson River. In addition, sub-bottom penetration data will be used to refine and plan installation techniques.

2.3 Landfall Survey

Surveys were conducted at the proposed landfall locations along the proposed underwater transmission cable route. The survey information will be used to plan and assess potential impacts associated with land/water transitions.

Landfall # 1 (Landfall Chart 1, Chart 105 of Lake Champlain Route)

This Landfall site is on the West side of Lake Champlain. It consists of vacant, wooded lands, with no bulkhead. The site is adjoined by a railroad to the west. There are trees and vegetation throughout the site.

Landfall # 1A (Landfall Chart 2, Chart 1 of Champlain Canal Lock 12-11 Route)

This Landfall site is on the West side of the Champlain Canal, with no bulkhead. A sewage treatment plant exists on site. The site is adjoined by a railroad bridge to the north, and the railroad runs through the site. Another railroad adjoins the site to the west. Poultney Street adjoins the site at the North West corner. Riverside Drive is an asphalt road that runs through the entire site, and has a tunnel that runs under the railroad. The sewage treatment plant is active, and consists of two treatment tanks, an administration building, an asphalt parking area, and a storage shed. There are two mechanical buildings with fencing within the site. There are trees and vegetation on the site.

Landfall # 2A (Landfall Chart 3, Chart 6 of Champlain Canal Lock 12-11 Route)

Landfall #2A is on the west side of the Champlain Channel. There is a 3-foot wide concrete bulkhead. The site borders a railroad to the west, and North Old Route 4 is an asphalt roadway that runs through the entire site. There is a row of cedar trees through the site.

Landfall # 2 (Landfall Chart 4, Chart 1 of Champlain Canal Lock 11-9 Route)

This Landfall site is on the west side of the Champlain Canal. It consists of park lands, and there is a 3-foot wide concrete bulkhead. The site is adjoined by a railroad to the west. North Old Route 4 is an asphalt roadway running through the entire site. There are trees throughout the site.

Landfall # 3 (Landfall Chart 5, Chart 9 of Champlain Canal Lock 11-9 Route)

Landfall #3 is on the east side of the Champlain Canal, and consists of vacant woodlands. There is no bulkhead. The site is adjoined by farmland. There are trees and vegetation throughout the site.

Landfall # 3A (Landfall Chart 6, Chart 1 of Champlain Canal Lock 9 South Route)

This Landfall site is on the east side of the Champlain Canal. It consists of vacant woodlands, with no bulkhead. The site is adjoined by farmland. There is a secondary water way running through the site, and trees and vegetation exist throughout the site.

Landfall # 4 (Landfall Chart 7, Chart 3 of Champlain Canal Lock 9 South Route)

This Landfall site is on the west side of the Champlain Canal. It consists of vacant woodlands, with no bulkhead. The site is adjoined by a railroad at the western end. There are trees, and vegetation throughout the site.

Landfall # 5 (Landfall Chart 8, Chart 1 of Hudson River Route)

This Landfall site is on the west side of the Hudson River, and consists of vegetation. There is no bulkhead. The site is adjoined by a railroad bridge overhead to the north. To the south, high tension electric lines run overhead on an approximately 100 ft. metal tower. There are trees, and vegetation throughout the site. The site may be submerged at high tide.

Landfall # 6 (Landfall Chart 9, Chart 114 of Hudson River Route)

The Yonkers landfall_site is on the east side of the Hudson River. It consists of a brick Esplanade, in new condition. The bulkhead is made of metal sheet piling, also in new condition. The site is newly built, with planted areas, roads with concrete curbs, and high rise residential buildings. There are many tree saplings, but few trees larger than 6 inches diameter.

Landfall # 7 (Landfall Chart 10, Chart 4 of Harlem River Route)

The Sherman Creek alternative landfall site is on the west side of the Harlem River. It consists of the remains of concrete and timber docks, both in poor repair. A bulkhead of metal sheet piling exists, and is in fair condition. There are few, if any trees larger than 6 inches diameter.

2.4 Sediment Survey

A review of existing information regarding sediment type, sediment quality, and sediment contaminant sources in the vicinity of the proposed underwater transmission cable route for CHPE project was conducted and is summarized in the Sediment Sampling Analysis Plan (SSAP) and the Application. The following sections summarize the physical and chemical data that was collected along the proposed underwater transmission cable route during the spring 2010 Marine Route Survey.

2.4.1 Methods

2.4.1.1 Sample Collection

Due to project schedule and size, two marine surveyors conducted the sediment survey for the Champlain Hudson Power Express Project: Alpine Ocean Seismic Survey (Alpine) and Ocean Surveys Inc (OSI). Alpine collected sediment cores from Lake Champlain, Champlain Canal and the Hudson River and OSI collected cores from the Harlem River, East River and Long Island Sound. Details of the sample collection including survey equipment, sampling events, core logs, and vibracore penetration logs are included in Appendix B Part II and III.

In general, sediment samples were collected at systematically determined intervals along the proposed transmission cable route for either physical analysis or both chemical and physical analyses. The number of samples collected within each segment of the transmission cable route varied based on the existing sediment type, data, existence of recent historic sediment quality data, and proximity of proposed route to historic sampling locations. Sediment core samples were collected using a vibracore. Sample target penetration depth and the type of analysis at each sample location varied along the proposed underwater transmission cable route.

2.4.1.2 Laboratory Sampling Procedures

Each core was logged and described. Core logs included information on sediment color, presence of sediment stratification, visual observation of grain size, general observation of cohesiveness and odor and were based on the Burmister grain-size classification. Sediment consistency, structure if any, density (qualitative description), odor and plasticity (qualitative description if clay is present in a sufficient percentage) was also described. Differences in sediment composition in core-length (i.e., stratification) were noted and the depth of each distinct sediment layer (greater than 30% of the core layer), was measured from the top of the sediment core. After the core was described photographs were taken of each core segment (Appendix B Part II and III).

Samples were collected from each significant sediment layer (greater than 30% of the core length). If there was a unit composed of numerous thin interbedded layers of sand and clay, a composite sample was collected from the interbedded sediment. If the sediments were consistent throughout the length of the core, and no significant changes were present, a representative sample was collected along the entire core and composited for analysis. Cores were analyzed for physical and/or chemical analyses.

Sediment testing for contaminants generally followed the parameters and procedures outlined in the Evaluation of Dredged Material Proposed for Ocean Disposal (EPA/USACE 1991) and the Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. -- Testing Manual (EPA/USACE 1998). Sediment testing included bulk chemistry only (Tier I Evaluation). Sediment sampling specifications were developed based on state agency requirements and NYS DEC Technical Operations & Guidance Series (TOGS) section 5.1.9 documentation.

In general cores were analyzed for the following physical analysis:

- USCS Classification – ASTM D 2487-06
- Moisture Content – ASTM D2216-05
- Specific Gravity – ASTM D 854-06
- Moisture, Ash and Organic Matter – ASTM D 2974
- Particle Size – ASTM D 422-63
- Atterberg Limits – ASTM D 4318-05
- Pocket Penetrometer
- Hand Held Torvane Test Results
- Direct Shear Test – ASTM D 3080
- Consolidation Test – ASTM D 2435-04-B
- Unconsolidated Indrained Triaxial Test – ASTM D 2850

Chemical analysis included:

- Metals using U.S. Environmental Protection Agency (USEPA) methods 6020A, 7474, and 9010B/9014
- Polycyclic aromatic hydrocarbons (PAHs) using USEPA methods 8270C-SIM
- Pesticides using USEPA method 8081
- Polychlorinated Biphenyls (PCBs) using USEPA method 8082 A
- Dioxin using USEPA method 1613B

Chemical results were compared to NYSDEC Technical and Operation Guidance Series (TOGS), Section 5.1.9, *Sediment Quality Threshold Values for Dredging, Riparian or In-water Placement.* There are three classifications (Class A, Class B, and Class C) for sediment based on known and presumed impacts on aquatic organisms/ecosystems. If one or more chemical samples exceed TOGS Class C NYSDEC will be consulted for potential additional characterization.

- Class A - If sediment chemistry is found to be at or below the chemical concentrations which define this class, dredging and in-water or riparian placement, at approved locations, can generally proceed.

- Class B - Dredging and riparian placement may be conducted with several restrictions. These restrictions may be applied based upon site-specific concerns and knowledge coupled with sediment evaluation.

- Class C - Class C dredged material is expected to be acutely toxic to aquatic biota and therefore, dredging and disposal requirements may be stringent. In water construction activities may require a method that minimizes the loss of resuspended sediment and use of a closed bucket is required during dredging.

TOGS 5.1.9 represents dioxins as the sum of toxic equivalency of 2,3,7,8-TCDD. This value is attained by multiplying the laboratory result of each dioxin/furan compound by the toxicity equivalency factor (TEF) shown in Appendix D of the TOGS document and then summing the products. TOGS 5.1.9 does not specify a treatment for non-detect laboratory results in the toxicity equivalence calculation. Tables 4a, 4b, and 5 of this document and the full data tables in Appendix B Parts II and III present the toxicity equivalence when non-detects are treated as zeros as well as when they are treated as half of the laboratory reporting limit, which is a more conservative approach.

Additionally, chemical results were compared to the ER-L and ER-M levels. Most historic sediment sampling programs analyzed chemical constituents covering a broad spatial and temporal scale using cores and/or sediment grabs. Concentrations of contaminants found in the sediment were compared to the effects range-median (ER-M) concentration, which corresponds to the median (50^{th} percentile) concentrations associated with adverse biological effects and the effects range-low (ER-L) concentrations which have a 10% probability (10^{th} percentile) of inducing adverse biological effects. Generally speaking, ER-M concentrations cause observable adverse effects in organisms and biological communities, while ER-L concentrations are those where biological effects begin to be observed. The ER-L and ER-M concentrations for common analytes are shown in Table 1.

2.4.2 Existing Conditions

2.4.2.1 Lake Champlain

Sediment cores were collected at 46 stations, S01 through S46, in the New York waters of Lake Champlain to supplement existing sediment data from the Lake Champlain Basin Program (LCBP), NYSDEC Rotating Intensive Basin Studies (RIBS), and the Lake Champlain Sediment Toxics Assessment Program, in the areas of the proposed cable route. Sample locations are depicted in Appendix A. Each core had a targeted depth of 5 ft. and was able to penetrate to a depth of at least 4.49 ft. (S33). Generally sediments were soft and the vibracore penetration ranged from 7.84 ft. to 13.43 ft. under it own weight, without the need to vibrate. Only cores S01 through S05 and S43 through S46, in the northern and southern extents of the lake required vibration to advance the cores. Detailed penetration logs showing the depth and rate of penetration and results of the physical analyses are included in Appendix B Part II.

Cores at each station were composited, in accordance with the SSAP, for chemical and physical analysis. Additional findings included an 8 inch diameter piece of wood, likely from a tree that fell into the Lake (core S46). The wood piece was found below approximately 2.4 ft. of sand and gravel, and similar loose sand and gravel were present below the wood. A piece of wood this size may indicate that other similar pieces of wood may be present in this area. The sediments from stations S01 through S46 can generally be characterized as gray to black very soft, wet clay or clayey silt. Detailed core logs and results of the physical analyses are included as Appendix B Part II.

Chemical analysis was conducted in order to better characterize contaminants along the cable route. Chemical analyses included metals, PAHs, and PCBs. There were very few exceedances of the ER-L and Class A values in the sediments of Lake Champlain. PAHs, pesticides, and PCBs were all below the ER-L and Class A values. Additionally, all detected metals concentrations were below the ER-L and Class A values with the exception of arsenic, copper and nickel which were detected above the ER-L values but below the ER-M values. Additionally, arsenic and copper were detected above Class A values (Class B) in the sample collected at station S18. All other sample results were within Class A values. Table 2 shows a summary of the exceedances in Lake Champlain. Full data tables are included in Appendix B Part II.

2.4.2.2 Champlain Canal

Sediment cores were collected at 17 stations, S47 through S63, in the Champlain Canal to supplement sediment data from the USEPA in the areas of the proposed cable route. Sample locations are depicted in Appendix A. Each core had a targeted depth of 10 ft. below authorized channel depth and core samples were able to penetrate to a depth of at least 11 ft. Detailed penetration logs showing the depth and rate of penetration are included in Appendix B Part II. Cores at each station were composited, in accordance with the SSAP, for chemical and physical analysis.

The sediments logged from stations S47 through S63 can generally be characterized as fine to coarse sand and very sticky clay. The clay has numerous layers differing slightly in shades of gray, and is likely to have been deposited during the retreat of the glaciers. The shear strength in some of these clays was up to 0.80 kilograms per square centimeters (kg/cm^2), but most sections had shear strength values of between 0.15 and 0.25 kg/cm^2. Detailed core logs and results of the physical analyses are included as Appendix B Part II.

The majority of detected compounds and metals concentrations were below the ER-L and Class A sediment values with the exception of nickel which was detected above the ER-L but below the ER-M in multiple samples and in the sample collected from station S63. Additionally, in the sample collected from station S63 nickel and zinc, were detected above the ER-L but below the ER-M as well as PAHs, acenapthylene and benzo(a)anthracene and pesticides, 4-4'DDD, 4,4'-DDE and total DDD/E/T. The sample collected from station S63 exceeded the Class A level for PCBs when calculated in accordance with TOGS 5.1.9 (sum of the 20 congeners multiplied by 2). Table 3 shows a summary of the exceedances in the Champlain Canal. Full data tables are included in Appendix B Part II.

2.4.2.3 Hudson River

Sediment cores were collected at 56 stations in the Hudson River to supplement existing sediment data. A review of the existing sediment data were presented in detail in the SSAP.

The Hudson River samples have been divided into three sample areas discussed in detail below.

Coxsackie Landing to Kingston (Mile 0 to Mile 45)

Sediment cores were collected at 19 stations, S64 through S82, in the Coxsackie Landing to Kingston section of the Hudson River. Sample locations are depicted in Appendix A. Each core had a targeted depth of 5 ft. below the river bottom, with the exception of S68a, S70, S73a and S82 which had target depths of 20 ft. below the authorized navigation channel depth. Station S68 was relocated approximately 3000 ft. to station S68a due to a rock outcrop in the original location. Penetrations ranged from 8.68 to 9.95 ft. in the 5-foot cores and 18.76 to 19.68 in the 20-foot cores. Five-foot samples were overdriven in order to increase sample material recovery for analytical purposes. Detailed penetration logs showing the depth and rate of penetration are included in Appendix B Part II. Cores at each station were composited, in accordance with the SSAP, for chemical and physical analysis. Detailed results of the physical analysis are also included in Appendix B, Part II.

This section of the route contained the largest variety of sediment types found along the Hudson River. The surficial sediments ranged from well mixed sand and gravel with cobbles to soft silt/clay. Sediments below the river bottom ranged from soft silt/clay to dense glacial till. Glacial till was present in bottom sections of cores collected at stations S64, S68a, S70, S73, and S73a. Of these, cores SHUD-S68a, S70 and S73a had target depths of 20 ft.

Chemical analysis of the composited samples was performed in order to better characterize contaminants along the cable route. Chemical analyses included metals, PAHs, pesticides, and PCBs.

In general, detected metals concentrations were below the ER-L and Class A values with the exception of nickel in the sample from station S71 and arsenic in samples S73a (0 to 3 ft.) and S73a (3 to 17 ft.). PAHs were also below the ER-L and Class A levels with the exception of fluorine at station S75, which was detected above the ER-L but below the ER-M, and sample S73 which exceeded the ER-L and ER-M levels for multiple compounds. Additionally the total detected PAHs were within Class C levels.

The samples collected from stations S65, S66, and S69 exceeded the Class A level for PCBs when calculated in accordance with TOGS 5.1.9 (sum of the 20 congeners multiplied by 2). The samples collected from stations S64 and S82 exceeded the Class B level for PCBs when calculated in accordance with TOGS 5.1.9 (sum of the 20 congeners multiplied by 2). Tables 4a and 4b shows a summary of the exceedances in the Hudson River. Full data tables are included in Appendix B Part II.

Kingston to Peekskill Bay (Mile 45-Mile 92)

Sediment cores were collected at 20 stations, S83 through S102, in the Kingston to Peekskill Bay portion of the Hudson River. Sample locations are depicted in Appendix A. Cores S84 through S92 had a targeted depth of 20 ft. below the river bottom. Cores S83 and S93 through S102 had a targeted depth of 5 ft. below the river bottom. Penetrations ranged from 9.53 to 10.46 ft. in the 5-foot cores and 18.91 to 19.63 in the 20-foot cores. Five-foot samples were overdriven in order to increase sample material recovery. Detailed penetration logs showing the depth and rate of penetration are included in Appendix B Part II. Cores at each station were composited, in accordance with the SSAP, for chemical and physical analysis. Detailed results of the physical analyses are also included in Appendix B Part II.

The surficial sediments encountered in this area consisted of very soft unconsolidated silts except at core 98, where the upper 4 inches of sediment consisted of gravel and cobbles in a silt/clay matrix. Sediments below the river bottom in all cases consisted of soft silt/clay, with a maximum shear strength measured with a hand Torvane of 0.18 kg/cm^2.

Chemical analysis of the composited samples was performed in order to better characterize contaminants along the cable route. Chemical analyses included metals, PAHs, pesticides, and PCBs.

Metals concentrations were below the ER-L and Class A levels in sample S95. Nickel was detected above the ER-L but below the ER-M levels in samples S89 through S93; all other metals were detected below the ER-L and Class A levels in these samples. Mercury was detected above the ER-L and Class A levels in samples S83, S85, and S87 as was lead in sample S83. Multiple metals were detected in samples S97, S199, and S101 above the ER-L but below the ER-M and above the Class A levels falling within Class B.

There were no PAH compounds detected above ER-L or Class A levels in samples S89, S91, S93 or S95. All other samples contained compounds detected above the ER-L but within the Class A levels with the exception of the total PAH concentrations in samples taken from the stations S83 and S97.

There were no pesticides detected in the samples from station S83 through S95 with the exception of S85 which exceeded the ER-L for multiple compounds, the ER-M for 4,4'DDT and dieldrin and the Class A values for total DDD/E/T. Multiple compounds exceeded the ER-L but were below the ER-M in sample S99 which also exceeded the Class A level for total DDD/E/T. Locations S97 and S101 exceeded the ER-L and ER-M for multiple compounds. Total DDD/E/T levels in these samples exceeded the Class B levels and fell within Class C.

Detected PCB concentrations were below the Class A values at locations S84, S89, S94, S95, S98, and S100. Samples S86, S92, S93, S96 and S102 exceeded Class A and fell within Class B. The remaining samples all exceeded the Class B values and fell within Class C. Tables 4a and 4b shows a summary of the exceedances in the Hudson River. Full data tables are included in Appendix B Part II.

Peekskill Bay to Spuytin Duyvil (Mile 92-Mile 4)

Sediment cores were collected at 16 stations, S103 through S119, in the Peekskill Bay to Spuytin Duyvil portion of the Hudson River. Sample locations are depicted in Appendix A. Cores S104 through S106 had a targeted depth of 20 ft. below the river bottom. Cores S103 and S107 through S119 had a targeted depth of 5 ft. below the river bottom. Penetrations ranged from 8.2 to 10.51 ft. in the 5-foot cores and 19.00 to 19.64 ft. in the 20-foot cores. Five-foot samples were overdriven in order to increase sample material recovery. Detailed penetration logs showing the depth and rate of penetration are included in Appendix B Part II. Cores at each station were composited, in accordance with the SSAP, for chemical and physical analysis. Detailed results of the physical analysis are included in Appendix B Part II.

In general, the sediments in this portion of the Hudson River consisted of very soft silts and clays, with occasional lenses of fine shell hash. This includes the 20-foot penetration cores collected at sites S104, S105 and S106 in the navigation channel offshore of Haverstraw, between mile 97.2 and mile 100.2. In all cases, the vibracore was able to penetrate the full core length under its own weight without vibration. Maximum shear strength measurements made with the handheld Torvane were less than 0.20 kg/cm^2.

The sample collected at station S111 (MP 108.79), south of the Tappan Zee Bridge, contained oysters on the top of the sediments in the core. Previous surveys conducted by Alpine near the Tappan Zee Bridge have shown the presence of oyster beds as well.

Chemical analysis of the composited samples was performed in order to better characterize contaminants along the cable route. Chemical analyses included metals, PAHs, pesticides, PCBs, and dioxin.

Metals concentrations were below the ER-L and Class A levels in sample S116. Metals were detected above the ER-L but below the ER-M levels in samples S107, S108, S109, S110, S112, S114, S117 and S118. Metals concentrations above the ER-L levels included arsenic and nickel. Samples S103 through S106 exceeded the ER-L and Class A levels for multiple metals while S113, S115 and S119 had limited exceedances including arsenic, lead, mercury and nickel.

There were no PAH compounds detected in samples taken from stations S108 or S109. In all samples analyzed detected PAH concentrations were below the Class A and ER-L values with the exception of samples from stations S110, through S113, S115 and S166 which exceeded the ER-L for acenapthlene, S105 and S106 which exceeded the ER-L for fluorine and S103 that exceeded the ER-L level for acenaphthylene and flourene.

There were no pesticides detected in the samples from station S107 through S112 and S114 through S119. Multiple compounds exceeded the ER-L but were below the ER-M in samples S103 through S106 and S112 with the exception of dieldrin which exceeded the ER-M in sample S103. Total detected DDD/E/T also exceeded the Class A levels falling within Class B.

Detected PCB concentrations were below the Class A values at locations S107 through S119 with the exception of S113 which exceeded Class A and fell within Class B. Sample S104 also fell within Class B levels. Samples S103, S105 and S106 exceeded Class B and fell within Class C. All total PCB concentrations were calculated in accordance with TOGS 5.1.9 (sum of the 20 congeners multiplied by 2).

Dioxins were detected at the Class A values at the four stations analyzed for dioxins in the Peekskill Bay to Spuytin Duyvil section of the Hudson River when non-detects were treated as zeros in the 2,3,7,8-TCDD toxicity equivalency calculation. All four samples are classified as Class B if non-detects are treated as half of the reporting limit.

Tables 4a and 4b show a summary of the exceedances in the Hudson River. Full data tables are included in Appendix B Part II.

2.4.2.4 Harlem River and East River

Harlem River

Sediment cores were collected at six stations, S120 through S125, in the Harlem River to supplement datasets from the USACE study area reports, U.S. Fish and Wildlife, and CARP in the areas of the proposed cable route. Sample locations are depicted in Appendix A. Each core had a targeted depth of 15 ft. below the river bottom. S120 and S123 were able to penetrate to a total depth of 16 ft. without encountering any obstruction. Core recoveries were 16.1 ft. and 14.6 ft. respectively. Two cores (01 and 02) were advanced at stations S120 and S123. The first cores were composited from 0 to 5 ft., in accordance with the SSAP, for chemical analysis. The 3- to 5-foot sections of the second cores were preserved as an undisturbed sample for physical analysis. Due to obstructions, limited penetration and limited recovery, four core attempts were made at locations S121, S122 and S124.

At station S121cores 01 and 02 had 3.5 ft. of penetration and 3.0 ft. of recovery. Core 01 was discarded. Core 02 was preserved as an undisturbed sample for physical analysis. Core 03 penetrated 6.9 ft. with 6.3 ft. of recovery and was composited from 0 to 3 ft. in accordance with the SSAP for chemical analysis. Core 04 penetrated 3.1 ft. with 2.6 ft. of recovery and was discarded.

At station S122 core 01 penetrated 9.5 ft. with 9.4 ft. of recovery and was composited in accordance with the SSAP for chemical analysis. Core 02 penetrated 7.7 ft. with 8.0 ft. of recovery and was preserved as an undisturbed sample for physical analysis. Core 03 penetrated 7.1 ft. with 6.9 ft. of recovery and was discarded as well as core 4 which penetrated 7.6 ft. with 7.6 ft. of recovery.

At station S124 cores 01 and 02 had 1.4 and 0.2 ft. of penetration and 0.8 and 0.2 ft. of recovery respectively and were discarded. Core 03 penetrated 14 ft. with 13.5 ft. of recovery and was composited from 0 to 13.5 ft. for chemical analysis, in accordance with the SSAP. Core 04 which penetrated 12.3 ft. with 12.2 ft. of recovery was preserved as an undisturbed sample for physical analysis.

At station S125 penetration ranged from 11 to 18 ft. below the river bottom. A visual inspection of Cores 01 and 02 indicated that the sediments had a dense petroleum-like substance from an unknown source. The S125 station was offset as the cores collected did not meet acceptable depth or recovery as per the SSAP. Two additional cores were collected (03 and 04). All four cores were delivered to the laboratory. Cores 01 and 02 were disposed of at an appropriately licensed facility. Cores 03 and 04 were sampled for physical and chemical analysis. They exhibited a strong petroleum odor. CHPEI notified NYSDEC of the conditions encountered at this location via the NYS Spills Hotline and NYSDEC spill number 1001382 was assigned.

The sediments logged from stations S120 through S125 can generally be characterized as gray to black sands and silts with trace clay and organics. A layer of slightly fibrous degraded organics was observed at stations S120, S121, and S122 at the 0- to 3.5-foot, 3.5- to 6-foot, and 5- to 10-foot intervals respectively. Additionally, silt and clay were observed in the 0- to 5-foot interval at station S122. Detailed core logs are included as Attachment X. Consolidation increased with depth in each core. Unified Soil Classification System (USCS) classification of the undisturbed cores using ASTM method D 24870-06 varied including SM – silty sand/silty sand with gravel, ML – silt with sand, SP – poorly graded sand with gravel, CH – fat clay, and MH – elastic silt. Physical analyses and full laboratory results are included as Appendix B Part III.

Chemical analysis of the composited samples was performed in order to better characterize contaminants along the underwater cable route. Chemical analyses included metals, PAHs, pesticides, PCBs, and dioxin.

Metals concentrations were below the ER-L and Class A levels in samples S120, S121 and S124. Metals were detected above the ER-L but below the ER-M levels in samples S122, and S123, all concentrations were below the Class A level. Multiple metals exceeded the ER-L and ER-M values in the sample from S125. Additionally the mercury concentration detected in this sample was within TOGS Class C.

There were no PAH compounds detected in samples taken from stations S120 or S123. Samples from stations S121, S122, and S124 had multiple PAH compounds detected above the ER-L value. Additionally, concentrations of phenanthrene and fluoranthene exceeded the ER-M values in samples S121 and S122 respectively. Multiple PAH compounds exceeded the ER-M values at station S125. Total detected PAH compounds from stations S121, and S122, were within the Class B levels. Total PAH compounds detected in the sample from station S125 were within Class C. All other samples fell within the Class A levels.

There were no pesticides detected in the samples from station S120, S123 and S124. Pesticide 4-4'-DDD was detected above the ER-L at stations S121 and S122, putting the total DDD/E/T for these areas in Class B. Detected pesticides in the S125 sample were all above the ER-M values with the exception of endrin. The total detected DDD/E/T compounds fall within Class C.

Detected PCB concentrations were all below the Class A values with the exception of the sample taken at station S125. Sample S125 exceeded the Class A level for PCBs when calculated in accordance with TOGS 5.1.9 (sum of the 20 congeners multiplied by 2).

Dioxins were detected in samples from stations S122 and S124. The 2,3,7,8-TCDD toxicity equivalence met TOGS 5.1.9 Class A standards when non-detects were treated as zeros. No dioxin isomers were detected in either sample interval at station S120 (0 to 11ft and 11-15ft). All four samples fall into Class B when one half of the reporting limit is used to calculate the toxicity equivalence to 2,3,7,8-TCDD.

Table 5 shows a summary of the exceedances in the Harlem River. Full data tables are included in Appendix B Part III.

East River

Sediment cores were attempted at 4 stations, S126 through S129, in the East River to supplement datasets from the USACE study area reports, U.S. Fish and Wildlife, and CARP in the areas of the proposed cable route. Sample locations are depicted in Appendix A. Each core had a targeted depth of 15 ft. below the river bottom. S126 was attempted 4 times but encountered refusal on rock. Two cores (01 and 02) were advanced at station S129 and penetrated to a depth of 16 ft. without obstruction. The first core was composited from 0 to 15 ft., in accordance with the SSAP, for chemical analysis. The 13- to 15-foot section of the second core was preserved as an undisturbed sample for physical analysis. Due to obstructions, limited penetration and limited recovery, three core attempts were made at locations S127 and S128. Cores 01 penetrated 11.5 and 11.6 ft. below the river bottom respectively. Penetration for cores 02 and 03 ranged from 14.9 to 15.9 without encountering obstruction. Core 01 was discarded from both stations. Cores 02 were composited in accordance with the SSAP for chemical analysis. Cores 03 were preserved as undisturbed samples for physical analysis.

The sediments logged from stations S127 through S129 varied. Sediments from station S127 included brown sands in the 0- to 10-foot interval and grey silty clay in the 10.5- to 15.5-foot interval. Sediments from station S128 were mostly homogenous and included black silts/very fine sands and clay with the exception of the 13.5- to 15-foot interval that was fine to coarse gravel. S129 was generally grey clayey silts and was homogenous. Detailed core logs are included as Attachment 2. Consolidation increased with depth in each core. Unified Soil Classification System (USCS) classification of the undisturbed cores using ASTM method D 24870-06 varied including SP – poorly graded sand and CH – fat clay (S127), SC – clayey sand (S128), and MH – elastic silt (S129). Physical analyses and full laboratory results are included as Appendix B Part III.

Detected metals concentrations were generally below the ER-L and Class A levels with the exception of nickel at station S127, arsenic and mercury at station S128 and arsenic at station S129 which exceeded the ER-L values and arsenic and mercury in sample S128 which exceeded the Class A values and was classified in category B.

Samples from stations S127 and S128 exceeded the ER-L values for multiple compounds. Multiple compounds in sample S128 also exceeded the ER-M values. There were no exceedances in the compounds detected in the samples from station S129. Total detected PAH compounds in samples S127 and S128 were categorized in Class B. Compounds in sample S129 were all within Class A levels.

There were no pesticides or PCBs detected in any of the East river samples.

None of the four East River samples analyzed for dioxins (S127 0-10.5', S127 10.5'-15.5', S128 and S129) exceeded the TOGS 5.1.9 Class A standard when non-detects were treated as zero in the 2,3,7,8-TCDD toxicity equivalence calculation. All four samples fall into the Class B standard when non-detects were represented by half of the reporting limit for each individual dioxin/furan compound.

Table 5 shows a summary of the exceedances in the East River. Full data tables are included in Appendix B Part III.

2.4.3 Summary

The Marine Route Survey physical and chemical analysis data supplements the existing sediment type and quality data in Section 4.6.3 of the Application. The marine survey data provided two basic types of information: 1) the physical characteristics of the sediments which influence the proposed installation technique for the cable as well as the cable engineering and design; and 2) the chemical characteristics of the sediments, specifically the presence of chemical contamination.

Overall, sediment type varied along the route from coarse grains to silts and clays. However, sediment cores exhibited little stratification at each location. Sediment type and physical analysis data will be used in the engineering of the cable and to refine and plan cable installation techniques.

Sediment quality varied along the proposed underwater transmission cable route. As expected, there were elevated PCB concentrations within the Hudson River. In addition, sediment quality within the Harlem River, East River and Long Island sound has been impacted due to industrial discharges, wastewater treatment plant discharges, CSOs, stormwater runoff, non-point source discharges, atmospheric deposition, and chemical and oil spills.

All 3 Classes of sediments were found along the proposed underwater transmission cable route. In most cases exceedances were for a single compound. Where possible the route will avoid known areas of high concentrations of contaminants. In addition, water quality modeling is being conducted to assess the potential impacts to water quality standards. If based on model results, there are potential impacts to water quality standards, CHPEI will develop methods to minimize the impact during installation to assure water quality (WQ) standards are met.

3.0 BENTHIC RESOURCES

3.1 Benthic Survey

Benthic communities interact with many of the trophic levels in freshwater, estuarine and marine environments. Through their diverse life histories they regulate plankton abundance, process sediments, provide food for higher trophic levels and can be the foundation of commercial fisheries. Their occurrence within and on substrates makes them a pathway for the movement of contaminants through aquatic ecosystems. Because of their bottom oriented life histories, they are a component of aquatic environments likely to be directly affected by cable installation, thus they are of primary importance in assessing project impacts.

Grain size, sediment compaction, substrate characteristics, and currents are among the important factors in habitat selection for benthic invertebrates. As a result of these habitat selection parameters, their distribution can be highly variable over small distances. Major differences occur over the length of the route based on salinity, such as observed in the Hudson River, as well as differences between lacustrine and riverine conditions. The benthic community may also differ depending on depth, as the deep water fauna of Lake Champlain or the main river channel, will be distinct from shallow embayments and shoreline areas.

A marine survey to collect route specific data on benthic communities along segments of the underwater transmission cable route was conducted in the spring 2010. The Hudson River was not sampled because there is an extensive existing database on the various benthic communities found along the proposed transmission cable route in this waterbody. The benthic data is summarized in the following sections. Additional information can be found in the technical reports (Appendix B). There are two separate benthic technical reports; one for Lake Champlain and Champlain Canal and one for the Harlem River, East River, and Western Long Island Sound.

3.1.1 Methods

Sampling Effort

Benthic samples were collected along the proposed cable route in Lake Champlain, Champlain Canal, Harlem River and East River. Sample locations were distributed based on sediment type and previously existing information on the benthic communities of these waterbodies (Appendix B).

Benthic samples were collected using a 0.1 m^2 Van Veen Grab. At each sampling location, the Van Veen Grab was lowered vertically until contact was made with the bottom and sediment was grabbed. The Van Veen Grab was then raised slowly to minimize sample disturbance. Once the sample was secured onboard, the grab was examined for acceptability (i.e., undisturbed surface sediment, no signs of leakage, and penetration depth of at least 5 cm) and redeployed if unacceptable. Valid samples were washed through a 500 µm mesh sieve. The material retained within the sieve was bottled, labeled, and preserved with 10% buffered formalin containing Rose Bengal stain for laboratory analysis. In the laboratory, organisms were sorted from the remaining debris, identified and enumerated. Identifications were made to the lowest practical identification level when not to the species level.

Data Analysis

The data were analyzed through methods appropriate to that waterbody. In the northern, freshwater portions of the route, data was analyzed in accordance with the quality assurance work plan for biological stream monitoring in New York State (Bode et al. 2002). In the southern portions of the route, data was analyzed through methods typically used to describe marine benthic invertebrate communities. Detailed methods for each portion of the route are available in Appendix B.

In Lake Champlain and the Champlain Canal, individuals were counted and densities per $0.1m^2$ were calculated for each species in each sample. Taxa richness was calculated by counting each taxa (family, genus or species) collected.

In the Harlem River and East River, the benthic community was assessed through calculation of density (per $1m^2$), taxa richness, Shannon-Wiener's diversity index, and evenness from the benthic grab data. The proportions of benthic organisms characterized as pollution tolerant (i.e., indicators of potentially degraded habitat conditions) and pollution sensitive (indicators of quality habitat) were also calculated, based on Adams 1998, Llansó et al. 2002, and Weis 1995. Pollution tolerant taxa include: Oligochaeta, *Leitoscoloplos fragilis*, Capitellidae, *Streblospio benedicti*, and *Mulinia lateralis*. Pollution sensitive taxa include: *Chaetopterus variopedatus*, *Spiophanes bombyx*, *Cyathura polita*, *Anadara transversa*, *Mercenaria mercenaria*, and *Acteocina canaliculata*.

3.1.2 Lake Champlain

A total of 70 benthic samples were collected in Lake Champlain during the spring of 2010, with an estimated total of 8,470 individuals from 114 benthic macroinvertebrate taxa. The benthic community sampled within the Project area in Lake Champlain was composed mainly of bivalves, dipterans, amphipods, and worms. Results from the benthic macroinvertebrate sampling in Lake Champlain are available in Appendix B Part II.

The most abundant organisms in the samples were zebra mussels (*Dreissena polymorpha*), chironomid midges (*Tanytarsus* sp.), and pea clams (*Pisidium* sp.), which comprised 18%, 12%, and 8% of the total species composition, respectively. Only 16 of the 114 taxa collected composed greater than 1.5% of the total catch (Table 6).

In general, taxa richness and the total number of individuals collected decreased with water depth. Shallower stations (less than 50 ft.), had the largest number of individuals and taxa, while the deepest stations (approximately 200 ft.) had the least. Water temperature also varied substantially between sites depending on depth.

Results from this survey did not find any unique benthic habitats or unexpectedly high densities of invertebrates. No threatened or endangered invertebrates were identified.

3.1.3 Champlain Canal

A total of 23 benthic samples were collected in the Champlain Canal during the spring of 2010, with an estimated total of 2,193 individuals from 62 benthic macroinvertebrate taxa. The benthic community was composed mainly of bivalves and dipterans. Results from the benthic macroinvertebrate sampling in the Champlain Canal are available in Appendix B Part II.

Similar to Lake Champlain, the most abundant organisms in the samples were zebra mussels (*Dreissena polymorpha*), composing 16% of all individuals collected. Pea clams (*Pisidium* sp.), and the dipterans *Limnodrilus hoffmeisteri* and *Chaoborus* sp., were the next most abundant taxa, comprising 15%, 10%, and 8%, of the total number of individuals, respectively. Only 15 of the 62 taxa collected composed over 1.5% of the total number of individuals collected (Table 7).

Results from this survey did not find any unique benthic habitats or unexpectedly high densities of invertebrates. No threatened or endangered invertebrates were identified. Samples from the shallow waters of the Champlain Canal were similar to those of the southern end of Lake Champlain. No Asian clams (*Corbicula* sp.) were collected.

3.1.4 Harlem River and East River

Harlem River

Benthic sampling in the Harlem River during spring 2010 revealed a community with few species and low abundances, except near its confluence to the East River (Appendix B Part III). A total of three benthic samples were collected in the Harlem River. Two of the three samples which were collected indicated that the benthic community was limited in species and those species that were present occurred at low densities. Diversity and evenness for these samples was relatively low, and samples were dominated by the polychaetes *Scolecolepides viridis*, Capitellidae and *Streblospio benedicti.*

The sample located closest to the East River was comprised of 14 unique taxa and had a total density of 45,305 individuals/m^2 . Taxa were distributed among annelids (9), arthropods (2), and other (3) including Actinaria, *Molgula manhattensis*, and Nematoda. Diversity and evenness were still fairly low, mostly due to the large collection of the pollution tolerant species *Streblospio benedicti.* This station, despite having a greater taxa richness, was dominated by pollution tolerant species (72% of assemblage), and only consisted of a few pollution sensitive individuals (3%). A summary of all species collected is available in Table 8.

East River

Four samples were collected in the East River, , two in the vicinity of the proposed Polletti landfall approach (B-99A and B-99B), one located near North Brother Island (B-101).., and the other located near College Point (B-102). Additional samples were attempted, but the substrate at those locations resulted in invalid grabs. The average sample density in the east river was 13,624 individuals/m^2. Results of the East River benthic sampling are available in Appendix B Part III.

The benthic community identified in sample B-101 consisted of 21 unique taxa and a total of 8,625 individuals/m^2. While the other consisted of taxa were distributed among annelids (10), arthropods (7), mollusks (3) and one Cnidarian (Actiniaria). The majority of the individuals collected were annelids (64%), followed by arthropods (33%). Diversity and evenness indices were relatively high compared to the Harlem River samples. The sample was dominated by the polychaete family Cirratulidae (2,851 individuals/m^2) and the amphipod family Aoridae (2,288 individuals/m^2). Pollution tolerant taxa comprised 7% of the assemblage, while pollution sensitive species comprised 2%.

Sample B-102 contained a 16 species and 38,880 individuals/m^2. Taxa consisted of annelids (10), arthropods (5), and 1 mollusk (*Mytilus edulis*, blue mussel). Similar to sample B-101, the majority of the individuals collected were Cirratulidae (23,700 individuals/m^2). The next most abundant species was the polychaete *Sabellaria vulgaris* (8,400 individuals/m^2). Diversity and evenness were slightly less at this location, mostly due to Cirratulidae dominating the assemblage. Pollution tolerant taxa comprised 4% of the assemblage, and no pollution sensitive taxa were collected.

The two samples collected along the proposed Polletti landfall route were collected immediately adjacent to each other due to hard substrate limiting where samples could be collected. Both of these samples indicated a highly impacted community, with stations B-99A and B-99B being composed nearly entirely of pollution tolerant taxa (83% and 94%, respectively), and a complete absence of pollution sensitive taxa. Seven (7) unique taxa were collected in each sample, and densities between samples were comparable (3,623 individuals/m^2 in sample B-99A, 3,514 individuals/m^2 in B-99B). The pollution tolerant taxa *Lietoscolopus fragilis* dominated both samples, accounting for 61% and 65% of the total catch, respectively.

With the exception of the samples near the Polletti landfall, dominated by pollution tolerant taxa, the benthic community in the East River was overall comprised of less pollution tolerant species, and higher taxa richness than the Harlem River. A summary of the most abundant species collected in the East River is available in Table 9.

3.1.5 Summary

The benthic macroinvertebrate community collected during the spring 2010 marine survey was generally typical of the communities expected in the major habitat types sampled. Lake Champlain had greater species richness and higher densities in shallow areas than in the deepwater stations. The Champlain Canal had a benthic community similar to the shallow water in Lake Champlain. In both areas the benthic community was dominated by zebra mussels, pea clams, and dipterans. No unique benthic habitats, unexpectedly high densities, or threatened and endangered species were found.

The Harlem River and East River showed differing levels of degradation in the benthic community. The Harlem River was dominated by the polychaetes, *Scolecolepides viridis*, Capitelledae, and *Streblospio benedictii*. Annelids and arthropods composed the majority of the East River samples, with pollution tolerant taxa dominating the samples obtained near the Polletti landfall. Twenty nine (29) taxa were found in the East River compared to 16 in the Harlem River.

Because urbanized estuaries (i.e., Harlem River and East River) are naturally subject to shifting gradients in salinity, temperature, turbidity and nutrients and are also affected by human-induced events, such as heavy vessel traffic and increased pollutant loading, the benthic organisms that inhabit urbanized estuaries are generally tolerant of changes in these parameters. Furthermore, the types of organisms that are common to disturbed environments are usually opportunistic species that can quickly repopulate a habitat following a disturbance through either migration or reproduction. It is likely that the benthic community along the proposed underwater transmission cable route would recover quickly following disturbance. Lake Champlain and the Champlain Canal display relatively diverse lacustrine benthic communities, although dominance by invasive zebra mussels is indicative of a disturbed community.

4.0 LITERATURE CITED

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TABLE 1
ER-L AND ER-M CONCENTRATIONS FOR COMMON ANALYTES*

Chemical Analyte	ER-L Concentration	ER-M Concentration
Trace Elements (ppm)		
Antimony	2	25
Arsenic	8.2	70
Cadmium	1.2	9.6
Chromium	81	370
Copper	34	270
Lead	43.7	218
Mercury	0.15	0.71
Nickel	20.9	51.6
Silver	1	3.7
Zinc	150	410
DDT and Metabolites (ppb)		
DDT	1	7
DDD	2	20
DDE	2	15
Total DDT	1.58	46.1
Other Pesticides (ppb)		
Chlordane	0.5	6
Dieldrin	0.02	8
Endrin	0.02	45
Polynuclear Aromatic Hydrocarbons (ppb)		
Acenaphthene	16	500
Acenaphthylene	44	640
Anthracene	85.3	1,100
Benzo(a)anthracene	261	1,600
Benzo(a)pyrene	430	1,600
Chrysene	384	2,800
Dibenzo(a,h)anthracene	63.4	260
Fluoranthene	600	5,100
Fluorene	19	540
2-Methylnaphthalene	70	670
Naphthalene	160	2,100
Phenanthrene	240	1,500
Pyrene	665	2,600
Total PAH	4,022	44,792

**Adapted from Adams and Benyi (2003).*

TABLE 2
Lake Champlain Sediment Samples
Comparison Criteria Exceedances
Champlain Hudson Power Express

		LOCATION	LC-01		LC-03		LC-05 R3		LC-08		LC-10		LC-12		LC-14		LC-16 0-1.7		LC-16 1.7-5.3		Comparison Criteria				
		SAMPLING DATE	5/7/2010		5/7/2010		5/8/2010		5/11/2010		5/12/2010		5/12/2010		5/13/2010		5/13/2010		5/13/2010		NOAA SQG		NYSDEC TOGS 5.1.9		
		LAB SAMPLE ID	L1007184-01		L1007184-02		L1007184-03		L1007184-04		L1007184-05		L1007184-06		L1007184-07		L1007184-08		L1007184-09						
		SAMPLE TYPE	Composite		Composite		Composite		Composite		Composite		Composite		Composite		Composite 0 - 1.7'		Composite 1.7 - 5.3'						
ANALYTE	CAS #	Units	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	ER-L	ER-M	Class A	Class B	Class C
Total Metals - Mansfield Lab																									
Arsenic, Total	7440-38-2	mg/kg	2.48	0.059	3.21	0.03	5.55	0.063	6.64	0.085	5.38	0.051	5.34	0.053	8.72	0.078	7.32	0.056	2.9	0.048	8.2	70	< 14	14 - 53	> 53
Copper, Total	7440-50-8	mg/kg	13.2	0.118	8.94	0.06	27.6	0.126	30.7	0.17	25.6	0.103	25.7	0.105	26.2	0.155	27.7	0.112	27.6	0.096	34	270	< 33	33 - 207	> 207
Nickel, Total	7440-02-0	mg/kg	17.5	0.118	10.7	0.06	42	0.126	46	0.17	38.6	0.103	39.3	0.105	40.3	0.155	39.3	0.112	35.9	0.096	20.9	51.6	--	--	--

		LOCATION	LC-18 CHEM		LC-20 CHEM		LC-22 CHEM		LC-24 CHEM		LC-26 CHEM		LC-28 CHEM		LC-30 CHEM S1		LC-30 CHEM S2		LC-32 CHEM		Comparison Criteria				
		SAMPLING DATE	5/14/2010		5/18/2010		5/18/2010		5/18/2010		5/16/2010		5/19/2010		5/20/2010		5/20/2010		5/20/2010		NOAA SQG		NYSDEC TOGS 5.1.9		
		LAB SAMPLE ID	L1007613-01		L1007613-03		L1007613-04		L1007613-05		L1007613-02		L1007613-06		L1007613-07		L1007613-08		L1007613-09						
		SAMPLE TYPE	Composite		Composite		Composite		Composite		Composite		Composite		Composite		Composite		Composite						
ANALYTE	CAS #	Units	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	ER-L	ER-M	Class A	Class B	Class C
Total Metals - Mansfield Lab																									
Arsenic, Total	7440-38-2	mg/kg	14.3	0.098	9.94	0.091	10.4	0.095	3.98	0.067	6.79	0.075	6.48	0.079	5.7	0.079	5.43	0.079	4.66	0.065	8.2	70	< 14	14 - 53	> 53
Copper, Total	7440-50-8	mg/kg	34	0.196	28.7	0.181	29.4	0.19	21.2	0.133	27.2	0.15	28.6	0.158	29.7	0.158	29.8	0.159	27.2	0.129	34	270	< 33	33 - 207	> 207
Nickel, Total	7440-02-0	mg/kg	51.6	0.196	44.2	0.181	44.7	0.19	30.9	0.133	41.7	0.15	47.8	0.158	50	0.158	51.2	0.159	47.1	0.129	20.9	51.6	--	--	--

		LOCATION	LC 34-CHEM		LC 36-CHEM		LC 38-CHEM		LC 40-CHEM		LC 42-CHEM 0-2'		LC 42-CHEM 2'-4.3'		LC 44-CHEM 0'-2.5'		LC 44-CHEM 3'-5'		LC 46-CHEM		Comparison Criteria				
		SAMPLING DATE	5/21/2010		5/21/2010		5/22/2010		5/22/2010		5/22/2010		5/22/2010		5/23/2010		5/23/2010		5/23/2010		NOAA SQG		NYSDEC TOGS 5.1.9		
		LAB SAMPLE ID	L1008110-01		L1008110-02		L1008110-03		L1008110-04		L1008110-05		L1008110-06		L1008110-07		L1008110-08		L1008110-09						
		SAMPLE TYPE	Composite		Composite		Composite		Composite		Composite 0 - 2'		Composite 2 - 4.3'		Composite 0 - 2.5'		Composite 3 - 5'		Composite						
ANALYTE	CAS #	Units	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	ER-L	ER-M	Class A	Class B	Class C
Total Metals - Mansfield Lab																									
Arsenic, Total	7440-38-2	mg/kg	4.67	0.066	3.71	0.068	3.42	0.07	4.39	0.058	2.13	0.042	3.12	0.051	3.88	0.05	2.23	0.043	2.73	0.045	8.2	70	< 14	14 - 53	> 53
Copper, Total	7440-50-8	mg/kg	25.3	0.133	25.2	0.136	23.5	0.139	25.6	0.116	15.1	0.084	17.8	0.102	24.8	0.101	11.3	0.086	16.5	0.089	34	270	< 33	33 - 207	> 207
Nickel, Total	7440-02-0	mg/kg	44.8	0.133	44.7	0.136	43.5	0.139	38.6	0.116	20.6	0.084	21.8	0.102	32.6	0.101	14.8	0.086	20.4	0.089	20.9	51.6	--	--	--

Classifications:

0.159	Indicates value does not exceed ER-L or TOGS 5.1.9 Class A criteria	0.159	Indicates value does not exceed ER-L or TOGS 5.1.9 Class A criteria
12.4	Indicates value exceeds ER-L value but below ER-M value	52	Indicates value is TOGS 5.1.9 Class B
362	Indicates value exceeds ER-M value	2.08	Indicates value is TOGS 5.1.9 Class C

Underlined or underlined/bolded text in a TOGS 5.1.9 Class A, B, or C coded field indicates corresponding ER-L/ER-M exceedance.

RL - Reporting Limit

Qualifiers:

ND Laboratory Non-detect Value

-- No criteria given for standard

Criteria:

ER-L / ER-M Adapted From: National Oceanic and Atmospheric Administration. *Sediment Quality Guidelines Developed for the National Status and Trends Program.* (June, 1999)

Class A, B, C Adapted From: New York State Department of Environmental Conservation Division of Water. *Technical & Operational Guidance Series (TOGS) 5.1.9 In-water and Riparian Management of Sediment and Dredged Material.* (November, 2004)

TABLE 3
Champlain Canal Sediment Samples
Comparison Criteria Exceedances
Champlain Hudson Power Express

ANALYTE	CAS #	Units	LC 47-CHEM 5/24/2010 L1008110-10 Composite RESULT	RL	LC 49-S1 5/24/2010 L1008110-11 Composite RESULT	RL	LC 49-S2 5/24/2010 L1008110-12 Composite RESULT	RL	LC 49-S3 5/24/2010 L1008110-13 Composite RESULT	RL	LC 51-CHEM 5/24/2010 L1008110-14 Composite RESULT	RL	LC 52-CHEM 5/24/2010 L1008110-15 Composite RESULT	RL
RIM Organochlorine Pesticides - Mansfield Lab														
4,4'-DDD	72-54-8	mg/kg	ND	0.00136	ND	0.00128	ND	0.00112	ND	0.00115	ND	0.00145	ND	0.00144
4,4'-DDE	72-55-9	mg/kg	ND	0.00136	ND	0.00128	ND	0.00112	ND	0.00115	ND	0.00145	ND	0.00144
4,4'-DDT	50-29-3	mg/kg	ND	0.00136	ND	0.00128	ND	0.00112	ND	0.00115	ND	0.00145	ND	0.00144
TOTAL DDD/E/T		mg/kg	ND	--	ND	--	ND	--	ND	--	ND	--	ND	--
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab														
Acenaphthylene	208-96-8	mg/kg	ND	0.0136	ND	0.0128	ND	0.0112	ND	0.0115	ND	0.0145	ND	0.0144
Benz(a)anthracene	56-55-3	mg/kg	ND	0.0136	ND	0.0128	ND	0.0112	ND	0.0115	ND	0.0145	0.0234	0.0144
TOTAL PAH		mg/kg	ND	--	ND	--	ND	--	ND	--	ND	--	0.1611	--
TOTAL PCBs		mg/kg	ND	--	ND	--	ND	--	ND	--	ND	--	ND	--
PCB CALCULATION PER TOGS 5.1.9		mg/kg	ND	--	ND	--	ND	--	ND	--	ND	--	ND	--
Total Metals - Mansfield Lab														
Nickel, Total	7440-02-0	mg/kg	35.4	0.095	25.6	0.076	25.9	0.074	26.5	0.07	40.5	0.092	19.6	0.097
Zinc, Total	7440-66-6	mg/kg	80.2	0.949	65.2	0.764	64.2	0.744	69.7	0.704	95.2	0.916	89.5	0.967

ANALYTE	CAS #	Units	LC 53-CHEM 5/25/2010 L1008110-16 Composite RESULT	RL	LC 54-CHEM 5/25/2010 L1008110-17 Composite RESULT	RL	LC 55-CHEM 5/25/2010 L1008110-18 Composite RESULT	RL	LC 56-CHEM 5/25/2010 L1008110-19 Composite RESULT	RL	LC 57-CHEM 5/25/2010 L1008110-20 Composite RESULT	RL	Comparison Criteria NOAA SQG ER-L	ER-M	NYSDEC TOGS 5.1.9 Class A	Class B	Class C
RIM Organochlorine Pesticides - Mansfield Lab																	
4,4'-DDD	72-54-8	mg/kg	ND	0.00113	ND	0.00125	ND	0.00116	ND	0.00168	ND	0.00161	0.002	0.02	--	--	--
4,4'-DDE	72-55-9	mg/kg	ND	0.00113	ND	0.00125	ND	0.00116	ND	0.00168	ND	0.00161	0.002	0.015	--	--	--
4,4'-DDT	50-29-3	mg/kg	ND	0.00113	ND	0.00125	ND	0.00116	ND	0.00168	ND	0.00161	0.001	0.007	--	--	--
TOTAL DDD/E/T		mg/kg	ND	--	ND	--	ND	--	ND	--	ND	--	0.00158	0.0461	< 0.003	0.003 - 0.03	> 0.03
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab																	
Acenaphthylene	208-96-8	mg/kg	ND	0.0113	ND	0.0125	ND	0.0116	ND	0.0168	ND	0.0161	0.044	0.64	--	--	--
Benz(a)anthracene	56-55-3	mg/kg	ND	0.0113	ND	0.0125	ND	0.0116	0.0208	0.0168	ND	0.0161	0.261	1.6	--	--	--
TOTAL PAH		mg/kg	ND	--	ND	--	ND	--	0.1247	--	ND	--	4.022	44.792	< 4	4 - 35	> 35
TOTAL PCBs		mg/kg	ND	--	ND	--	ND	--	ND	--	ND	--	--	--	--	--	--
PCB CALCULATION PER TOGS 5.1.9		mg/kg	ND	--	ND	--	ND	--	ND	--	ND	--	--	--	< 0.1	0.1 - 1	> 1
Total Metals - Mansfield Lab																	
Nickel, Total	7440-02-0	mg/kg	21.6	0.081	13.5	0.09	9.76	0.07	19.8	0.118	39.8	0.096	20.9	51.6	--	--	--
Zinc, Total	7440-66-6	mg/kg	64.8	0.812	46.9	0.902	42.1	0.7	84.3	1.18	90	0.958	150	410	--	--	--

ANALYTE	CAS #	Units	LC 59-CHEM 0'-2' 5/25/2010 L1008110-21 Composite 0 - 2' RESULT	RL	LC 59-CHEM 2'-10 5/25/2010 L1008110-22 Composite 2 - 10' RESULT	RL	LC 60-CHEM -0-4 5/26/2010 L1008110-23 Composite 0 - 4' RESULT	RL	LC 60-CHEM 4-10 5/26/2010 L1008110-24 Composite 4 - 10' RESULT	RL	LC 62-CHEM 5/26/2010 L1008110-25 Composite RESULT	RL	LC 63-CHEM 5/26/2010 L1008110-26 Composite RESULT	RL	Comparison Criteria NOAA SQG ER-L	ER-M	NYSDEC TOGS 5.1.9 Class A	Class B	Class C
RIM Organochlorine Pesticides - Mansfield Lab																			
4,4'-DDD	72-54-8	mg/kg	ND	0.00127	ND	0.00122	ND	0.0019	ND	0.00154	ND	0.00155	0.00473	0.00176	0.002	0.02	--	--	--
4,4'-DDE	72-55-9	mg/kg	ND	0.00127	ND	0.00122	ND	0.0019	ND	0.00154	ND	0.00155	0.00525	0.00176	0.002	0.015	--	--	--
4,4'-DDT	50-29-3	mg/kg	ND	0.00127	ND	0.00122	ND	0.0019	ND	0.00154	ND	0.00155	ND	0.00176	0.001	0.007	--	--	--
TOTAL DDD/E/T		mg/kg	ND	--	ND	--	ND	--	ND	--	ND	--	0.00998	--	0.00158	0.0461	< 0.003	0.003 - 0.03	> 0.03
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab																			
Acenaphthylene	208-96-8	mg/kg	ND	0.0127	ND	0.0122	ND	0.019	ND	0.0154	ND	0.0155	0.059	0.0176	0.044	0.64	--	--	--
Benz(a)anthracene	56-55-3	mg/kg	ND	0.0127	ND	0.0122	0.0567	0.019	ND	0.0154	ND	0.0155	0.294	0.0176	0.261	1.6	--	--	--
TOTAL PAH		mg/kg	0.0518	--	ND	--	0.4428	--	ND	--	ND	--	1.7099	--	4.022	44.792	< 4	4 - 35	> 35
TOTAL PCBs		mg/kg	ND	--	ND	--	ND	--	ND	--	ND	--	0.14031	--	--	--	--	--	--
PCB CALCULATION PER TOGS 5.1.9		mg/kg	ND	--	ND	--	ND	--	ND	--	ND	--	0.28062	--	--	--	< 0.1	0.1 - 1	> 1
Total Metals - Mansfield Lab																			
Nickel, Total	7440-02-0	mg/kg	20.5	0.082	30.1	0.082	28.2	0.131	41.9	0.092	43.7	0.109	24.6	0.116	20.9	51.6	--	--	--
Zinc, Total	7440-66-6	mg/kg	69.4	0.815	69.8	0.815	118	1.31	90.3	0.923	95.1	1.09	169	1.16	150	410	--	--	--

Classifications:

0.159	Indicates value does not exceed ER-L or TOGS 5.1.9 Class A criteria
12.4	Indicates value exceeds ER-L value but below ER-M value
362	Indicates value exceeds ER-M value
0.159	Indicates value does not exceed ER-L or TOGS 5.1.9 Class A criteria
52	Indicates value is TOGS 5.1.9 Class B
2.08	Indicates value is TOGS 5.1.9 Class C

Underlined or underlined/bolded text in a TOGS 5.1.9 Class A, B, or C coded field indicates corresponding ER-L/ER-M exceedance.

RL - Reporting Limit

Qualifiers:

ND Laboratory Non-detect Value

-- No criteria given for standard

Criteria:

ER-L / ER-M Adapted From: National Oceanic and Atmospheric Administration. *Sediment Quality Guidelines Developed for the National Status and Trends Program.* (June, 1999)

Class A, B, C Adapted From: New York State Department of Environmental Conservation Division of Water. *Technical & Operational Guidance Series (TOGS) 5.1.9 In-water and Riparian Management of Sediment and Dredged Material.* (November, 2004)

TABLE 4a
Hudson River Sediment Samples
Comparison Criteria Exceedances
Champlain Hudson Power Express

LOCATION / SAMPLING DATE / LAB SAMPLE ID / SAMPLE TYPE			HR 65, 4/28/2010, L1006232-09, Composite			HR 67 S-1, 4/27/2010, L1006232-05, Composite			HR 67 S-2, 4/27/2010, L1006232-06, Composite			HR 67 S-3, 4/27/2010, L1006232-07, Composite			HR 68A, 4/28/2010, L1006232-12, Composite		
ANALYTE	CAS #	Units	RESULT		RL	RESULT		RL	RESULT		RL	RESULT		RL	RESULT		RL
RIM Organochlorine Pesticides - Mansfield Lab																	
4,4'-DDD	72-54-8	mg/kg	ND		0.0011	ND		0.00124	ND		0.00127	ND		0.0013	ND		0.0011
4,4'-DDE	72-55-9	mg/kg	ND		0.0011	ND		0.00124	ND		0.00127	ND		0.0013	ND		0.0011
4,4'-DDT	50-29-3	mg/kg	ND		0.0011	ND		0.00124	ND		0.00127	ND		0.0013	ND		0.0011
TOTAL DDD/E/T		mg/kg	ND		--	ND		--	ND		--	ND		--	ND		--
Dieldrin	60-57-1	mg/kg	ND		0.0011	ND		0.00124	ND		0.00127	ND		0.0013	ND		0.0011
Endrin	72-20-8	mg/kg	ND		0.0011	ND		0.00124	ND		0.00127	ND		0.0013	ND		0.0011
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab																	
Acenaphthene	83-32-9	mg/kg	ND		0.011	ND		0.0124	ND		0.0127	ND		0.013	ND		0.011
Acenaphthylene	208-96-8	mg/kg	ND		0.011	ND		0.0124	ND		0.0127	ND		0.013	ND		0.011
Anthracene	120-12-7	mg/kg	0.0283		0.011	ND		0.0124	ND		0.0127	ND		0.013	ND		0.011
Benz(a)anthracene	56-55-3	mg/kg	0.0484		0.011	ND		0.0124	ND		0.0127	ND		0.013	ND		0.011
Benzo(a)pyrene	50-32-8	mg/kg	0.0317		0.011	ND		0.0124	ND		0.0127	ND		0.013	ND		0.011
Chrysene	218-01-9	mg/kg	0.0396		0.011	ND		0.0124	ND		0.0127	ND		0.013	ND		0.011
Dibenz(a,h)anthracene	53-70-3	mg/kg	ND		0.011	ND		0.0124	ND		0.0127	ND		0.013	ND		0.011
Fluoranthene	206-44-0	mg/kg	0.0824		0.011	ND		0.0124	ND		0.0127	ND		0.013	ND		0.011
Fluorene	86-73-7	mg/kg	0.0166		0.011	ND		0.0124	ND		0.0127	ND		0.013	ND		0.011
Naphthalene	91-20-3	mg/kg	0.0274		0.011	ND		0.0124	ND		0.0127	ND		0.013	ND		0.011
Phenanthrene	85-01-8	mg/kg	0.0887		0.011	ND		0.0124	ND		0.0127	ND		0.013	ND		0.011
Pyrene	129-00-0	mg/kg	0.0979		0.011	ND		0.0124	ND		0.0127	ND		0.013	ND		0.011
TOTAL PAH		mg/kg	0.5659		--	ND		--	ND		--	ND		--	ND		--
Dioxin																	
I-TEF-1988 TEQ (ND=0)	--	mg/kg	NA			NA			NA			NA			NA		
I-TEF-1988 TEQ (ND=1/2)	--	mg/kg	NA			NA			NA			NA			NA		
Total Metals - Mansfield Lab																	
Arsenic, Total	7440-38-2	mg/kg	2.26	D2	0.033	1.9	D2	0.042	2.06	D2	0.039	2.05	D2	0.043	2.73	D2	0.039
Cadmium, Total	7440-43-9	mg/kg	0.167	D2	0.033	0.099	D2	0.042	0.093	D2	0.039	0.103	D2	0.043	ND	D2	0.039
Chromium, Total	7440-47-3	mg/kg	9.01	D2	0.133	8.42	D2	0.166	8.44	D2	0.156	8.94	D2	0.17	5.95	D2	0.156
Copper, Total	7440-50-8	mg/kg	5.31	D2	0.066	5.92	D2	0.083	7.04	D2	0.078	7.85	D2	0.085	2.64	D2	0.078
Lead, Total	7439-92-1	mg/kg	7.17	D2	0.033	3.3	D2	0.042	3.17	D2	0.039	3.56	D2	0.043	4.06	D2	0.039
Mercury, Total	7439-97-6	mg/kg	0.044	D5	0.013	ND	D5	0.017	ND	D5	0.015	ND	D5	0.017	ND	D5	0.015
Nickel, Total	7440-02-0	mg/kg	10.1	D2	0.066	13.2	D2	0.083	13.1	D2	0.078	13.8	D2	0.085	11	D2	0.078
Zinc, Total	7440-66-6	mg/kg	54.7	D2	0.663	47.8	D2	0.832	46	D2	0.782	49.6	D2	0.85	42.8	D2	0.78

LOCATION / SAMPLING DATE / LAB SAMPLE ID / SAMPLE TYPE	HR 69, 4/27/2010, L1006232-04, Composite			HR 71, 4/27/2010, L1006232-02, Composite			HR 73A 0-3', 4/26/2010, L1006223-14, Composite 0-3'			HR 73A 3'-17', 4/26/2010, L1006223-15, Composite 3-17'			HR 75, 4/26/2010, L1006223-12, Composite			Comparison Criteria: NOAA SQG		Comparison Criteria: NYSDEC TOGS 5.1.9		
ANALYTE	RESULT		RL	RESULT		RL	RESULT		RL	RESULT		RL	RESULT		RL	ER-L	ER-M	Class A	Class B	Class C
RIM Organochlorine Pesticides - Mansfield Lab																				
4,4'-DDD	ND		0.00117	ND		0.00141	ND		0.00141	ND		0.0013	ND		0.00128	0.002	0.02	--	--	--
4,4'-DDE	ND		0.00117	ND		0.00141	ND		0.00141	ND		0.0013	ND		0.00128	0.002	0.015	--	--	--
4,4'-DDT	ND		0.00117	ND		0.00141	ND		0.00141	ND		0.0013	ND		0.00128	0.001	0.007	--	--	--
TOTAL DDD/E/T	ND		--	ND		--	ND		--	ND		--	ND		--	0.00158	0.0461	< 0.003	0.003 - 0.03	> 0.03
Dieldrin	ND		0.00117	ND		0.00141	ND		0.00141	ND		0.0013	ND		0.00128	0.00002	0.008	< 0.11	0.11 - 0.48	> 0.48
Endrin	ND		0.00117	ND		0.00141	ND		0.00141	ND		0.0013	ND		0.00128	0.00002	0.045	--	--	--
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab																				
Acenaphthene	ND		0.0117	ND		0.0141	0.205		0.0141	ND		0.013	ND		0.0128	0.016	0.5	--	--	--
Acenaphthylene	ND		0.0117	ND		0.0141	0.317		0.0141	ND		0.013	ND		0.0128	0.044	0.64	--	--	--
Anthracene	ND		0.0117	ND		0.0141	1.47		0.0141	ND		0.013	ND		0.0128	0.0853	1.1	--	--	--
Benz(a)anthracene	ND		0.0117	ND		0.0141	4.59		0.0141	ND		0.013	ND		0.0128	0.261	1.6	--	--	--
Benzo(a)pyrene	ND		0.0117	ND		0.0141	2.67		0.0141	ND		0.013	ND		0.0128	0.43	1.6	--	--	--
Chrysene	ND		0.0117	ND		0.0141	2.64		0.0141	ND		0.013	ND		0.0128	0.384	2.8	--	--	--
Dibenz(a,h)anthracene	ND		0.0117	ND		0.0141	0.43		0.0141	ND		0.013	ND		0.0128	0.0634	0.26	--	--	--
Fluoranthene	ND		0.0117	ND		0.0141	8.55	D2	0.0141	ND		0.013	ND		0.0128	0.6	5.1	--	--	--
Fluorene	ND		0.0117	ND		0.0141	0.624		0.0282	ND		0.013	ND		0.0128	0.019	0.54	--	--	--
Naphthalene	0.0274		0.0117	ND		0.0141	0.147		0.0141	ND		0.013	ND		0.0128	0.16	2.1	--	--	--
Phenanthrene	ND		0.0117	ND		0.0141	6.44		0.0141	ND		0.013	ND		0.0128	0.24	1.5	--	--	--
Pyrene	0.0154		0.0117	ND		0.0141	6.69		0.0141	ND		0.013	ND		0.0128	0.665	2.6	--	--	--
TOTAL PAH	0.0428		--	ND		--	42.033		--	ND		--	ND		--	4.022	44.792	< 4	4 - 35	> 35
Dioxin																				
I-TEF-1988 TEQ (ND=0)	NA			NA			NA			NA			NA			--	--	< 4.50E-06	4.50E-06 to 5.00E-05	> 5.00E-05
I-TEF-1988 TEQ (ND=1/2)	NA			NA			NA			NA			NA			--	--	< 4.50E-06	4.50E-06 to 5.00E-05	> 5.00E-05
Total Metals - Mansfield Lab																				
Arsenic, Total	2.15	D2	0.038	7.78	D2	0.042	10.2	D2	0.044	12.5	D2	0.039	2.99	D2	0.038	8.2	70	< 14	14 - 53	> 53
Cadmium, Total	0.12	D2	0.038	0.087	D2	0.042	0.192	D2	0.044	0.091	D2	0.039	0.086	D2	0.038	1.2	9.6	< 1.2	1.2 - 9.5	> 9.5
Chromium, Total	7.85	D2	0.15	25.6	D2	0.169	12.8	D2	0.176	10.1	D2	0.157	9.56	D2	0.153	81	370	--	--	--
Copper, Total	3.22	D2	0.075	31.3	D2	0.085	13.4	D2	0.088	7.34	D2	0.078	6.41	D2	0.077	34	270	< 33	33 - 207	> 207
Lead, Total	4.42	D2	0.038	10.1	D2	0.042	16.5	D2	0.044	5.93	D2	0.039	4.64	D2	0.038	43.7	218	< 33	33 - 166	> 166
Mercury, Total	ND	D5	0.013	0.022	D5	0.018	0.052	D5	0.017	ND	D5	0.014	ND	D5	0.017	0.15	0.71	< 0.17	0.17 - 1.6	> 1.6
Nickel, Total	12.4	D2	0.075	36.4	D2	0.085	19.2	D2	0.088	16	D2	0.078	17.6	D2	0.077	20.9	51.6	--	--	--
Zinc, Total	58.2	D2	0.749	104	D2	0.845	78.8	D2	0.88	55.4	D2	0.784	61.6	D2	0.765	150	410	--	--	--

LOCATION / SAMPLING DATE / LAB SAMPLE ID / SAMPLE TYPE			HR 77 S-1, 4/26/2010, L1006223-09, Composite			HR 77 S-2, 4/26/2010, L1006223-10, Composite			HR 79, 4/25/2010, L1006223-07, Composite			HR 81, 4/25/2010, L1006223-05, Composite			HR 83, 4/23/2010, L1006002-02, Composite		
ANALYTE	CAS #	Units	RESULT		RL	RESULT		RL	RESULT		RL	RESULT		RL	RESULT		RL
RIM Organochlorine Pesticides - Mansfield Lab																	
4,4'-DDD	72-54-8	mg/kg	ND		0.00127	ND		0.00127	ND		0.00129	ND		0.00125	ND		0.00164
4,4'-DDE	72-55-9	mg/kg	ND		0.00127	ND		0.00127	ND		0.00129	ND		0.00125	0.00199		0.00164
4,4'-DDT	50-29-3	mg/kg	ND		0.00127	ND		0.00127	ND		0.00129	ND		0.00125	ND		0.00164
TOTAL DDD/E/T		mg/kg	ND		--	ND		--	ND		--	ND		--	0.00199		--
Dieldrin	60-57-1	mg/kg	ND		0.00127	ND		0.00127	ND		0.00129	ND		0.00125	ND		0.00164
Endrin	72-20-8	mg/kg	ND		0.00127	ND		0.00127	ND		0.00129	ND		0.00125	ND		0.00164
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab																	
Acenaphthene	83-32-9	mg/kg	ND		0.0127	ND		0.0127	ND		0.0129	ND		0.0125	0.0473		0.0164
Acenaphthylene	208-96-8	mg/kg	ND		0.0127	ND		0.0127	ND		0.0129	ND		0.0125	0.0969		0.0164
Anthracene	120-12-7	mg/kg	ND		0.0127	ND		0.0127	ND		0.0129	ND		0.0125	0.193		0.0164
Benz(a)anthracene	56-55-3	mg/kg	0.0239		0.0127	ND		0.0127	ND		0.0129	ND		0.0125	0.657		0.0164
Benzo(a)pyrene	50-32-8	mg/kg	0.0189		0.0127	ND		0.0127	ND		0.0129	ND		0.0125	0.51		0.0164
Chrysene	218-01-9	mg/kg	0.0192		0.0127	ND		0.0127	ND		0.0129	ND		0.0125	0.456		0.0164
Dibenz(a,h)anthracene	53-70-3	mg/kg	ND		0.0127	ND		0.0127	ND		0.0129	ND		0.0125	0.0868		0.0164
Fluoranthene	206-44-0	mg/kg	0.02		0.0127	ND		0.0127	ND		0.0129	ND		0.0125	0.669		0.0164
Fluorene	86-73-7	mg/kg	ND		0.0127	ND		0.0127	ND		0.0129	ND		0.0125	0.107		0.0164
Naphthalene	91-20-3	mg/kg	ND		0.0127	ND		0.0127	ND		0.0129	0.0201		0.0125	0.203		0.0164
Phenanthrene	85-01-8	mg/kg	0.0283		0.0127	ND		0.0127	ND		0.0129	ND		0.0125	0.591		0.0164
Pyrene	129-00-0	mg/kg	0.0301		0.0127	0.0139		0.0127	ND		0.0129	ND		0.0125	0.87		0.0164
TOTAL PAH		mg/kg	0.1573		--	0.0139		--	ND		--	0.0201		--	5.758		--
Dioxin																	
I-TEF-1988 TEQ (ND=0)	--	mg/kg	NA			NA			NA			NA			NA		
I-TEF-1988 TEQ (ND=1/2)	--	mg/kg	NA			NA			NA			NA			NA		
Total Metals - Mansfield Lab																	
Arsenic, Total	7440-38-2	mg/kg	2.91	D2	0.044	2.96	D2	0.043	2.92	D2	0.038	2.59	D2	0.044	10.6	D2	0.058
Cadmium, Total	7440-43-9	mg/kg	0.154	D2	0.044	0.235	D2	0.043	0.095	D2	0.038	0.1	D2	0.044	0.775	D2	0.058
Chromium, Total	7440-47-3	mg/kg	10.8	D2	0.177	12.9	D2	0.173	9.23	D2	0.15	9.34	D2	0.177	35.5	D2	0.231
Copper, Total	7440-50-8	mg/kg	6.24	D2	0.089	6.01	D2	0.087	7.09	D2	0.075	5.44	D2	0.089	31.5	D2	0.116
Lead, Total	7439-92-1	mg/kg	6.15	D2	0.044	8.39	D2	0.043	8.34	D2	0.038	6.38	D2	0.044	36.4	D2	0.058
Mercury, Total	7439-97-6	mg/kg	0.021	D5	0.017	0.033	D5	0.014	ND	D5	0.014	ND	D5	0.017	0.383	D5	0.021
Nickel, Total	7440-02-0	mg/kg	16.4	D2	0.089	14.9	D2	0.087	16.2	D2	0.075	15.4	D2	0.089	20.7	D2	0.116
Zinc, Total	7440-66-6	mg/kg	73.6	D2	0.887	83.4	D2	0.865	53.4	D2	0.751	59.6	D2	0.885	134	D2	1.16

LOCATION / SAMPLING DATE / LAB SAMPLE ID / SAMPLE TYPE	HR 85, 4/23/2010, L1006002-05, Composite			HR 87, 4/24/2010, L1006223-02, Composite			HR 89, 4/24/2010, L1006223-01, Composite			HR 91, 4/22/2010, L1005999-19, Composite			HR 93, 4/22/2010, L1005999-17, Composite			Comparison Criteria: NOAA SQG		Comparison Criteria: NYSDEC TOGS 5.1.9		
ANALYTE	RESULT		RL	RESULT		RL	RESULT		RL	RESULT		RL	RESULT		RL	ER-L	ER-M	Class A	Class B	Class C
RIM Organochlorine Pesticides - Mansfield Lab																				
4,4'-DDD	0.00735		0.00166	ND		0.0015	ND		0.00166	ND		0.00161	ND		0.00161	0.002	0.02	--	--	--
4,4'-DDE	0.00488		0.00166	ND		0.0015	ND		0.00166	ND		0.00161	ND		0.00161	0.002	0.015	--	--	--
4,4'-DDT	**0.0139**		0.00166	ND		0.0015	ND		0.00166	ND		0.00161	ND		0.00161	0.001	0.007	--	--	--
TOTAL DDD/E/T	0.02613		--	ND		--	ND		--	ND		--	ND		--	0.00158	0.0461	< 0.003	0.003 - 0.03	> 0.03
Dieldrin	**0.0944**		0.00166	ND		0.0015	ND		0.00166	ND		0.00161	ND		0.00161	0.00002	0.008	< 0.11	0.11 - 0.48	> 0.48
Endrin	0.0191		0.00166	ND		0.0015	ND		0.00166	ND		0.00161	ND		0.00161	0.00002	0.045	--	--	--
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab																				
Acenaphthene	0.0262		0.0166	0.0156		0.015	ND		0.0166	ND		0.0161	ND		0.0161	0.016	0.5	--	--	--
Acenaphthylene	0.0691		0.0166	ND		0.015	ND		0.0166	ND		0.0161	ND		0.0161	0.044	0.64	--	--	--
Anthracene	0.0954		0.0166	0.0466		0.015	ND		0.0166	ND		0.0161	ND		0.0161	0.0853	1.1	--	--	--
Benz(a)anthracene	0.258		0.0166	0.123		0.015	ND		0.0166	ND		0.0161	0.0375		0.0161	0.261	1.6	--	--	--
Benzo(a)pyrene	0.186		0.0166	0.0798		0.015	ND		0.0166	ND		0.0161	0.0274		0.0161	0.43	1.6	--	--	--
Chrysene	0.191		0.0166	0.0866		0.015	ND		0.0166	ND		0.0161	0.0313		0.0161	0.384	2.8	--	--	--
Dibenz(a,h)anthracene	0.0395		0.0166	ND		0.015	ND		0.0166	ND		0.0161	ND		0.0161	0.0634	0.26	--	--	--
Fluoranthene	0.345		0.0166	0.193		0.015	ND		0.0166	ND		0.0161	0.0366		0.0161	0.6	5.1	--	--	--
Fluorene	0.0653		0.0166	0.0327		0.015	ND		0.0166	ND		0.0161	ND		0.0161	0.019	0.54	--	--	--
Naphthalene	0.111		0.0166	0.0249		0.015	ND		0.0166	ND		0.0161	ND		0.0161	0.16	2.1	--	--	--
Phenanthrene	0.286		0.0166	0.17		0.015	ND		0.0166	ND		0.0161	0.0293		0.0161	0.24	1.5	--	--	--
Pyrene	0.435		0.0166	0.223		0.015	ND		0.0166	ND		0.0161	0.0467		0.0161	0.665	2.6	--	--	--
TOTAL PAH	2.7125		--	2.1222		--	ND		--	ND		--	0.3023		--	4.022	44.792	< 4	4 - 35	> 35
Dioxin																				
I-TEF-1988 TEQ (ND=0)	NA			NA			NA			NA			NA			--	--	< 4.50E-06	4.50E-06 to 5.00E-05	> 5.00E-05
I-TEF-1988 TEQ (ND=1/2)	NA			NA			NA			NA			NA			--	--	< 4.50E-06	4.50E-06 to 5.00E-05	> 5.00E-05
Total Metals - Mansfield Lab																				
Arsenic, Total	6.91	D2	0.052	10	D2	0.053	6.31	D2	0.052	7.36	D2	0.055	5.3	D2	0.051	8.2	70	< 14	14 - 53	> 53
Cadmium, Total	0.674	D2	0.052	0.294	D2	0.053	0.195	D2	0.052	0.124	D2	0.055	0.367	D2	0.051	1.2	9.6	< 1.2	1.2 - 9.5	> 9.5
Chromium, Total	44.8	D2	0.206	17.2	D2	0.211	18.9	D2	0.206	25.3	D2	0.222	21.4	D2	0.202	81	370	--	--	--
Copper, Total	28.3	D2	0.103	19.7	D2	0.106	14.9	D2	0.103	18	D2	0.111	15.6	D2	0.101	34	270	< 33	33 - 207	> 207
Lead, Total	23.3	D2	0.052	15.5	D2	0.053	11.5	D10	0.258	10.9	D2	0.055	13.5	D5	0.126	43.7	218	< 33	33 - 166	> 166
Mercury, Total	0.236	D5	0.019	0.204	D5	0.018	0.027	D5	0.02	0.041	D5	0.021	0.077	D5	0.02	0.15	0.71	< 0.17	0.17 - 1.6	> 1.6
Nickel, Total	24.6	D2	0.103	23	D2	0.106	24	D2	0.103	28.4	D2	0.111	22.4	D2	0.101	20.9	51.6	--	--	--
Zinc, Total	133	D2	1.03	88.9	D2	1.06	79.9	D2	1.03	88.5	D2	1.11	82.4	D2	1.01	150	410	--	--	--

Classifications:

0.159	Indicates value does not exceed ER-L or TOGS 5.1.9 Class A criteria
12.4	Indicates value exceeds ER-L value but below ER-M value
362	Indicates value exceeds ER-M value
0.159	Indicates value does not exceed ER-L or TOGS 5.1.9 Class A criteria
52	Indicates value is TOGS 5.1.9 Class B
2.08	Indicates value is TOGS 5.1.9 Class C

Underlined or underlined/bolded text in a TOGS 5.1.9 Class A, B, or C coded field indicates corresponding ER-L/ER-M exceedance.

RL - Reporting Limit

Qualifiers:

ND	Laboratory Non-detect Value
--	No criteria given for standard
B	The analyte was detected above the reporting limit in the associated method blank.
D20	Concentration of analyte was quantified from diluted analysis. Dilution factor shown to right of qualifer.
NA	Constituent not analyzed for.
DPE	Indicates the presence of a peak in the polychlorinated diphenylether channel that could cause a false positive or an overestimation of the affected analyte(s).
Q	Indicates the presence of a quantitative interference. This situation may result in an underestimation of the affected analyte(s).

Criteria:

ER-L / ER-M	Adapted From: National Oceanic and Atmospheric Administration. *Sediment Quality Guidelines Developed for the National Status and Trends Program.* (June, 1999)
Class A, B, C	Adapted From: New York State Department of Environmental Conservation Division of Water. *Technical & Operational Guidance Series (TOGS) 5.1.9 In-water and Riparian Management of Sediment and Dredged Material.* (November, 2004)

TABLE 4a
Hudson River Sediment Samples
Comparison Criteria Exceedances
Champlain Hudson Power Express

LOCATION			HR095			HR097 S-1			HR097 S-2			HR097 S-3			HR099		
SAMPLING DATE			4/21/2010			4/21/2010			4/21/2010			4/21/2010			4/21/2010		
LAB SAMPLE ID			L1005999-15			L1005999-11			L1005999-12			L1005999-13			L1005999-09		
SAMPLE TYPE			Composite			Composite			Composite			Composite			Composite		
ANALYTE	CAS #	Units	RESULT		RL	RESULT		RL	RESULT		RL	RESULT		RL	RESULT		RL
RIM Organochlorine Pesticides - Mansfield Lab																	
4,4'-DDD	72-54-8	mg/kg	ND		0.00156	0.00962		0.00184	0.00759		0.00191	0.00555		0.00188	0.00237		0.00185
4,4'-DDE	72-55-9	mg/kg	ND		0.00156	**0.0152**		0.00184	0.0136		0.00191	0.00876		0.00188	0.00364		0.00185
4,4'-DDT	50-29-3	mg/kg	ND		0.00156	**0.0097**		0.00184	0.00637		0.00191	0.00502		0.00188	ND		0.00185
TOTAL DDD/E/T		mg/kg	ND		--	0.03452		--	0.02756		--	0.01933		--	0.00601		--
Dieldrin	60-57-1	mg/kg	ND		0.00156	ND		0.00184	ND		0.00191	ND		0.00188	ND		0.00185
Endrin	72-20-8	mg/kg	ND		0.00156	0.00976		0.00184	0.00766		0.00191	0.0055		0.00188	ND		0.00185
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab																	
Acenaphthene	83-32-9	mg/kg	ND		0.0156	0.0473		0.0184	0.0441		0.0191	0.0431		0.0188	ND		0.0185
Acenaphthylene	208-96-8	mg/kg	ND		0.0156	0.163		0.0184	0.15		0.0191	0.169		0.0188	0.0261		0.0185
Anthracene	120-12-7	mg/kg	ND		0.0156	0.164		0.0184	0.167		0.0191	0.186		0.0188	0.0353		0.0185
Benz(a)anthracene	56-55-3	mg/kg	ND		0.0156	0.722		0.0184	0.719		0.0191	0.7		0.0188	0.143		0.0185
Benzo(a)pyrene	50-32-8	mg/kg	ND		0.0156	0.595		0.0184	0.59		0.0191	0.586		0.0188	0.118		0.0185
Chrysene	218-01-9	mg/kg	ND		0.0156	0.536		0.0184	0.536		0.0191	0.534		0.0188	0.115		0.0185
Dibenz(a,h)anthracene	53-70-3	mg/kg	ND		0.0156	0.13		0.0184	0.123		0.0191	0.115		0.0188	0.0231		0.0185
Fluoranthene	206-44-0	mg/kg	ND		0.0156	0.904		0.0184	0.86		0.0191	0.826		0.0188	0.225		0.0185
Fluorene	86-73-7	mg/kg	ND		0.0156	0.113		0.0184	0.115		0.0191	0.122		0.0188	0.0244		0.0185
Naphthalene	91-20-3	mg/kg	ND		0.0156	0.109		0.0184	0.106		0.0191	0.122		0.0188	0.0189		0.0185
Phenanthrene	85-01-8	mg/kg	ND		0.0156	0.564		0.0184	0.569		0.0191	0.565		0.0188	0.12		0.0185
Pyrene	129-00-0	mg/kg	ND		0.0156	1.01		0.0184	1		0.0191	0.968		0.0188	0.24		0.0185
TOTAL PAH		mg/kg	ND		--	6.9243		--	6.7591		--	6.6821		--	1.4776		--
Dioxin																	
I-TEF-1988 TEQ (ND=0)	--	mg/kg	NA			NA			NA			NA			NA		
I-TEF-1988 TEQ (ND=1/2)	--	mg/kg	NA			NA			NA			NA			NA		
Total Metals - Mansfield Lab																	
Arsenic, Total	7440-38-2	mg/kg	4.64	D2	0.054	14.7	D2	0.064	14.6	D2	0.062	15.2	D2	0.062	7.68	D2	0.057
Cadmium, Total	7440-43-9	mg/kg	0.194	D2	0.054	5.44	D2	0.064	4.7	D2	0.062	3.31	D2	0.062	1.18	D2	0.057
Chromium, Total	7440-47-3	mg/kg	16.1	D2	0.217	115	D2	0.254	108	D2	0.248	86.7	D2	0.247	39.2	D2	0.226
Copper, Total	7440-50-8	mg/kg	11.3	D2	0.108	78	D2	0.127	75.7	D2	0.124	69.1	D2	0.123	26	D2	0.113
Lead, Total	7439-92-1	mg/kg	6.86	D2	0.054	94.7	D2	0.064	91.7	D2	0.062	81.6	D2	0.062	25.8	D2	0.057
Mercury, Total	7439-97-6	mg/kg	0.02	D5	0.018	0.987	D5	0.023	0.912	D5	0.023	0.876	D5	0.026	0.215	D5	0.023
Nickel, Total	7440-02-0	mg/kg	20.3	D2	0.108	37.8	D2	0.127	37.2	D2	0.124	35.4	D2	0.123	25.5	D2	0.113
Zinc, Total	7440-66-6	mg/kg	68.4	D2	1.08	309	D2	1.27	302	D2	1.24	273	D2	1.23	119	D2	1.13

LOCATION	HR101			HR103			HR103 S2			HR104			HR105			Comparison Criteria				
SAMPLING DATE	4/20/2010			4/20/2010			4/20/2010			4/20/2010			4/20/2010			NOAA SQG		NYSDEC TOGS 5.1.9		
LAB SAMPLE ID	L1005999-01			L1005999-03			L1005999-04			L1005999-05			L1005999-06							
SAMPLE TYPE	Composite			Composite			Composite			Composite			Composite							
ANALYTE	RESULT		RL	RESULT		RL	RESULT		RL	RESULT		RL	RESULT		RL	ER-L	ER-M	Class A	Class B	Class C
RIM Organochlorine Pesticides - Mansfield Lab																				
4,4'-DDD	0.00955		0.00187	0.00582		0.00204	0.0064		0.00195	0.0081		0.0017	0.00961		0.00181	0.002	0.02	--	--	--
4,4'-DDE	**0.0188**		0.00187	0.00797		0.00204	0.00807		0.00195	0.00318		0.0017	0.00541		0.00181	0.002	0.015	--	--	--
4,4'-DDT	**0.00872**		0.00187	0.00308		0.00204	0.00286		0.00195	ND		0.0017	0.00265		0.00181	0.001	0.007	--	--	--
TOTAL DDD/E/T	0.03707		--	0.01687		--	0.01733		--	0.01128		--	0.01767		--	0.00158	0.0461	< 0.003	0.003 - 0.03	> 0.03
Dieldrin	ND		0.00187	ND		0.00204	**0.0255**		0.00195	ND		0.0017	ND		0.00181	0.00002	0.008	< 0.11	0.11 - 0.48	> 0.48
Endrin	ND		0.00187	ND		0.00204	ND		0.00195	ND		0.0017	ND		0.00181	0.00002	0.045	--	--	--
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab																				
Acenaphthene	0.0416		0.0187	ND		0.0204	ND		0.0195	ND		0.017	ND		0.0181	0.016	0.5	--	--	--
Acenaphthylene	0.0878		0.0187	0.0526		0.0204	0.0442		0.0195	ND		0.017	0.0254		0.0181	0.044	0.64	--	--	--
Anthracene	0.0883		0.0187	0.054		0.0204	0.0562		0.0195	0.0181		0.017	0.0309		0.0181	0.0853	1.1	--	--	--
Benz(a)anthracene	0.48		0.0187	0.214		0.0204	0.235		0.0195	0.0626		0.017	0.115		0.0181	0.261	1.6	--	--	--
Benzo(a)pyrene	0.366		0.0187	0.164		0.0204	0.184		0.0195	0.0466		0.017	0.0893		0.0181	0.43	1.6	--	--	--
Chrysene	0.364		0.0187	0.174		0.0204	0.188		0.0195	0.0504		0.017	0.095		0.0181	0.384	2.8	--	--	--
Dibenz(a,h)anthracene	0.0865		0.0187	0.0407		0.0204	0.0449		0.0195	ND		0.017	0.0207		0.0181	0.0634	0.26	--	--	--
Fluoranthene	0.788		0.0187	0.317		0.0204	0.393		0.0195	0.094		0.017	0.192		0.0181	0.6	5.1	--	--	--
Fluorene	0.0771		0.0187	0.0434		0.0204	0.0416		0.0195	0.018		0.017	0.0281		0.0181	0.019	0.54	--	--	--
Naphthalene	0.0729		0.0187	0.0464		0.0204	0.042		0.0195	ND		0.017	0.0295		0.0181	0.16	2.1	--	--	--
Phenanthrene	0.43		0.0187	0.2		0.0204	0.215		0.0195	0.0599		0.017	0.113		0.0181	0.24	1.5	--	--	--
Pyrene	0.841		0.0187	0.35		0.0204	0.398		0.0195	0.108		0.017	0.209		0.0181	0.665	2.6	--	--	--
TOTAL PAH	5.0182		--	2.3241		--	2.5119		--	0.6345		--	1.283		--	4.022	44.792	< 4	4 - 35	> 35
Dioxin																				
I-TEF-1988 TEQ (ND=0)	NA			NA			NA			NA			NA			--	--	< 4.50E-06	4.50E-06 to 5.00E-05	> 5.00E-05
I-TEF-1988 TEQ (ND=1/2)	NA			NA			NA			NA			NA			--	--	< 4.50E-06	4.50E-06 to 5.00E-05	> 5.00E-05
Total Metals - Mansfield Lab																				
Arsenic, Total	11.3	D2	0.069	9.81	D2	0.069	9.39	D2	0.065	9.24	D2	0.05	9.76	D2	0.058	8.2	70	< 14	14 - 53	> 53
Cadmium, Total	6.5	D2	0.069	2.04	D2	0.069	1.8	D2	0.065	0.662	D2	0.05	1.24	D2	0.058	1.2	9.6	< 1.2	1.2 - 9.5	> 9.5
Chromium, Total	142	D2	0.277	78.4	D2	0.275	77.6	D2	0.26	36.1	D2	0.2	52.6	D2	0.23	81	370	--	--	--
Copper, Total	83.1	D2	0.138	61.1	D2	0.137	60.7	D2	0.13	25.4	D2	0.1	36.3	D2	0.115	34	270	< 33	33 - 207	> 207
Lead, Total	100	D2	0.069	54.7	D2	0.069	54.6	D2	0.065	29.2	D5	0.125	42.3	D5	0.144	43.7	218	< 33	33 - 166	> 166
Mercury, Total	0.753	D5	0.022	0.45	D5	0.027	0.441	D5	0.026	0.209	D5	0.02	0.365	D5	0.022	0.15	0.71	< 0.17	0.17 - 1.6	> 1.6
Nickel, Total	38.3	D2	0.138	35.2	D2	0.137	34.2	D2	0.13	28.8	D2	0.1	31.5	D2	0.115	20.9	51.6	--	--	--
Zinc, Total	317	D2	1.38	210	D2	1.37	208	D2	1.3	115	D2	0.999	146	D2	1.15	150	410	--	--	--

LOCATION			HR106			HR 107			HR 108			HR 109			HR 110		
SAMPLING DATE			4/20/2010			4/18/2010			4/18/2010			4/19/2010			4/19/2010		
LAB SAMPLE ID			L1005999-07			L1005665-12			L1005665-11			L1005665-10			L1005665-09		
SAMPLE TYPE			Composite			Composite			Composite			Composite			Composite		
ANALYTE	CAS #	Units	RESULT		RL	RESULT		RL	RESULT		RL	RESULT		RL	RESULT		RL
RIM Organochlorine Pesticides - Mansfield Lab																	
4,4'-DDD	72-54-8	mg/kg	0.00782		0.00154	ND		0.00178	ND		0.00191	ND		0.00171	ND		0.00185
4,4'-DDE	72-55-9	mg/kg	0.00507		0.00154	ND		0.00178	ND		0.00191	ND		0.00171	ND		0.00185
4,4'-DDT	50-29-3	mg/kg	0.00239		0.00154	ND		0.00178	ND		0.00191	ND		0.00171	ND		0.00185
TOTAL DDD/E/T		mg/kg	0.01528		--	ND		--	ND		--	ND		--	ND		--
Dieldrin	60-57-1	mg/kg	ND		0.00154	ND		0.00178	ND		0.00191	ND		0.00171	ND		0.00185
Endrin	72-20-8	mg/kg	ND		0.00154	ND		0.00178	ND		0.00191	ND		0.00171	ND		0.00185
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab																	
Acenaphthene	83-32-9	mg/kg	ND		0.0154	ND		0.0178	ND		0.0191	ND		0.0171	0.0209		0.0185
Acenaphthylene	208-96-8	mg/kg	0.0231		0.0154	ND		0.0178	ND		0.0191	ND		0.0171	ND		0.0185
Anthracene	120-12-7	mg/kg	0.0322		0.0154	ND		0.0178	ND		0.0191	ND		0.0171	ND		0.0185
Benz(a)anthracene	56-55-3	mg/kg	0.136		0.0154	ND		0.0178	ND		0.0191	ND		0.0171	ND		0.0185
Benzo(a)pyrene	50-32-8	mg/kg	0.105		0.0154	ND		0.0178	ND		0.0191	ND		0.0171	ND		0.0185
Chrysene	218-01-9	mg/kg	0.129		0.0154	ND		0.0178	ND		0.0191	ND		0.0171	ND		0.0185
Dibenz(a,h)anthracene	53-70-3	mg/kg	0.0219		0.0154	ND		0.0178	ND		0.0191	ND		0.0171	ND		0.0185
Fluoranthene	206-44-0	mg/kg	0.183		0.0154	0.0195		0.0178	ND		0.0191	ND		0.0171	ND		0.0185
Fluorene	86-73-7	mg/kg	0.0265		0.0154	ND		0.0178	ND		0.0191	ND		0.0171	ND		0.0185
Naphthalene	91-20-3	mg/kg	0.024		0.0154	ND		0.0178	ND		0.0191	ND		0.0171	0.0416	B	0.0185
Phenanthrene	85-01-8	mg/kg	0.113		0.0154	ND		0.0178	ND		0.0191	ND		0.0171	ND		0.0185
Pyrene	129-00-0	mg/kg	0.199		0.0154	0.0203		0.0178	ND		0.0191	ND		0.0171	ND		0.0185
TOTAL PAH		mg/kg	1.3471		--	0.0398		--	ND		--	ND		--	0.0625		--
Dioxin																	
I-TEF-1988 TEQ (ND=0)	--	mg/kg	NA			NA			NA			NA			NA		
I-TEF-1988 TEQ (ND=1/2)	--	mg/kg	NA			NA			NA			NA			NA		
Total Metals - Mansfield Lab																	
Arsenic, Total	7440-38-2	mg/kg	9.32	D2	0.057	7.56	D2	0.056	9.2	D2	0.058	8.44	D2	0.058	8.07	D2	0.062
Cadmium, Total	7440-43-9	mg/kg	1.08	D2	0.057	0.181	D2	0.056	0.234	D2	0.058	0.16	D2	0.058	0.162	D2	0.062
Chromium, Total	7440-47-3	mg/kg	45.9	D2	0.226	24.2	D2	0.225	30.1	D2	0.233	23.2	D2	0.231	23.7	D2	0.246
Copper, Total	7440-50-8	mg/kg	33.6	D2	0.113	14.6	D2	0.113	18.9	D2	0.117	14.1	D2	0.115	15.8	D2	0.123
Lead, Total	7439-92-1	mg/kg	33.9	D2	0.057	8.99	D2	0.056	13	D2	0.058	10.9	D5	0.144	11	D2	0.062
Mercury, Total	7439-97-6	mg/kg	0.329	D5	0.019	0.033	D5	0.024	0.079	D5	0.025	0.034	D5	0.023	0.045	D5	0.023
Nickel, Total	7440-02-0	mg/kg	29.6	D2	0.113	26.4	D2	0.113	28	D2	0.117	24.8	D2	0.115	25.7	D2	0.123
Zinc, Total	7440-66-6	mg/kg	140	D2	1.13	85	D2	1.13	96.1	D2	1.17	80.6	D2	1.15	83.3	D2	1.23

LOCATION	HR 112			HR 113			HR 114			HR 115			HR 116			Comparison Criteria				
SAMPLING DATE	4/19/2010			4/19/2010			4/19/2010			4/18/2010			4/18/2010			NOAA SQG		NYSDEC TOGS 5.1.9		
LAB SAMPLE ID	L1005665-07			L1005665-08			L1005665-06			L1005665-05			L1005665-04							
SAMPLE TYPE	Composite			Composite			Composite			Composite			Composite							
ANALYTE	RESULT		RL	RESULT		RL	RESULT		RL	RESULT		RL	RESULT		RL	ER-L	ER-M	Class A	Class B	Class C
RIM Organochlorine Pesticides - Mansfield Lab																				
4,4'-DDD	ND		0.00188	ND		0.00181	ND		0.00156	ND		0.00159	ND		0.00156	0.002	0.02	--	--	--
4,4'-DDE	ND		0.00188	0.00229		0.00181	ND		0.00156	ND		0.00159	ND		0.00156	0.002	0.015	--	--	--
4,4'-DDT	ND		0.00188	ND		0.00181	ND		0.00156	ND		0.00159	ND		0.00156	0.001	0.007	--	--	--
TOTAL DDD/E/T	ND		--	0.00229		--	ND		--	ND		--	ND		--	0.00158	0.0461	< 0.003	0.003 - 0.03	> 0.03
Dieldrin	ND		0.00188	ND		0.00181	ND		0.00156	ND		0.00159	ND		0.00156	0.00002	0.008	< 0.11	0.11 - 0.48	> 0.48
Endrin	ND		0.00188	ND		0.00181	ND		0.00156	ND		0.00159	ND		0.00156	0.00002	0.045	--	--	--
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab																				
Acenaphthene	0.0261		0.0188	0.0288		0.0181	ND		0.0156	0.0179		0.0159	0.0163		0.0156	0.016	0.5	--	--	--
Acenaphthylene	ND		0.0188	ND		0.0181	ND		0.0156	ND		0.0159	ND		0.0156	0.044	0.64	--	--	--
Anthracene	ND		0.0188	ND		0.0181	ND		0.0156	ND		0.0159	ND		0.0156	0.0853	1.1	--	--	--
Benz(a)anthracene	ND		0.0188	0.0354		0.0181	ND		0.0156	0.0263		0.0159	ND		0.0156	0.261	1.6	--	--	--
Benzo(a)pyrene	ND		0.0188	0.0313		0.0181	ND		0.0156	0.0236		0.0159	ND		0.0156	0.43	1.6	--	--	--
Chrysene	ND		0.0188	0.0322		0.0181	ND		0.0156	0.0236		0.0159	ND		0.0156	0.384	2.8	--	--	--
Dibenz(a,h)anthracene	ND		0.0188	ND		0.0181	ND		0.0156	ND		0.0159	ND		0.0156	0.0634	0.26	--	--	--
Fluoranthene	ND		0.0188	0.0596		0.0181	ND		0.0156	0.0479		0.0159	ND		0.0156	0.6	5.1	--	--	--
Fluorene	ND		0.0188	ND		0.0181	ND		0.0156	ND		0.0159	ND		0.0156	0.019	0.54	--	--	--
Naphthalene	0.0451	B	0.0188	0.0484	B	0.0181	0.0485	B	0.0156	0.0389	B	0.0159	0.0568	B	0.0156	0.16	2.1	--	--	--
Phenanthrene	ND		0.0188	0.0245		0.0181	ND		0.0156	0.02		0.0159	ND		0.0156	0.24	1.5	--	--	--
Pyrene	ND		0.0188	0.0625		0.0181	ND		0.0156	0.0526		0.0159	ND		0.0156	0.665	2.6	--	--	--
TOTAL PAH	0.0712		--	0.6643		--	0.0485		--	0.3184		--	0.0731		--	4.022	44.792	< 4	4 - 35	> 35
Dioxin																				
I-TEF-1988 TEQ (ND=0)	2.82E-07		--	NA			NA			NA			4.42E-07		--	--	--	< 4.50E-06	4.50E-06 to 5.00E-05	> 5.00E-05
I-TEF-1988 TEQ (ND=1/2)	6.51E-06		--	NA			NA			NA			6.67E-06		--	--	--	< 4.50E-06	4.50E-06 to 5.00E-05	> 5.00E-05
Total Metals - Mansfield Lab																				
Arsenic, Total	7.88	D2	0.061	9.12	D2	0.062	11.3	D2	0.05	6.6	D2	0.055	6.46	D2	0.044	8.2	70	< 14	14 - 53	> 53
Cadmium, Total	0.163	D2	0.061	0.427	D2	0.062	0.113	D2	0.05	0.172	D2	0.055	0.127	D2	0.044	1.2	9.6	< 1.2	1.2 - 9.5	> 9.5
Chromium, Total	23.8	D2	0.242	37.8	D2	0.247	17.2	D2	0.2	23.3	D2	0.221	17.6	D2	0.177	81	370	--	--	--
Copper, Total	14.8	D2	0.121	29.8	D2	0.124	10	D2	0.1	15.2	D2	0.111	9.89	D2	0.089	34	270	< 33	33 - 207	> 207
Lead, Total	11.5	D5	0.151	24.3	D2	0.062	7.02	D2	0.05	11	D2	0.055	6.54	D2	0.044	43.7	218	< 33	33 - 166	> 166
Mercury, Total	0.042	D5	0.024	0.229	D5	0.023	ND	D5	0.021	0.346	D5	0.022	0.036	D5	0.018	0.15	0.71	< 0.17	0.17 - 1.6	> 1.6
Nickel, Total	25.2	D2	0.121	27.6	D2	0.124	18.9	D2	0.1	21.1	D2	0.111	18	D2	0.089	20.9	51.6	--	--	--
Zinc, Total	82.7	D2	1.21	119	D2	1.24	58	D2	0.999	75.3	D2	1.11	56.4	D2	0.885	150	410	--	--	--

Classifications:

0.159	Indicates value does not exceed ER-L or TOGS 5.1.9 Class A criteria
12.4	Indicates value exceeds ER-L value but below ER-M value
362	Indicates value exceeds ER-M value
0.159	Indicates value does not exceed ER-L or TOGS 5.1.9 Class A criteria
52	Indicates value is TOGS 5.1.9 Class B
2.08	Indicates value is TOGS 5.1.9 Class C

Underlined or underlined/bolded text in a TOGS 5.1.9 Class A, B, or C coded field indicates corresponding ER-L/ER-M exceedance.

RL - Reporting Limit

Qualifiers:

ND	Laboratory Non-detect Value
--	No criteria given for standard
B	The analyte was detected above the reporting limit in the associated method blank.
D20	Concentration of analyte was quantified from diluted analysis. Dilution factor shown to right of qualifer.
NA	Constituent not analyzed for.
DPE	Indicates the presence of a peak in the polychlorinated diphenylether channel that could cause a false positive or an overestimation of the affected analyte(s).
Q	Indicates the presence of a quantitative interference. This situation may result in an underestimation of the affected analyte(s).

Criteria:

ER-L / ER-M	Adapted From: National Oceanic and Atmospheric Administration. *Sediment Quality Guidelines Developed for the National Status and Trends Program.* (June, 1999)
Class A, B, C	Adapted From: New York State Department of Environmental Conservation Division of Water. *Technical & Operational Guidance Series (TOGS) 5.1.9 In-water and Riparian Management of Sediment and Dredged Material.* (November, 2004)

TABLE 4a
Hudson River Sediment Samples
Comparison Criteria Exceedances
Champlain Hudson Power Express

		LOCATION / SAMPLING DATE / LAB SAMPLE ID / SAMPLE TYPE	HR 117 4/18/2010 L1005665-03 Composite			HR 118 4/18/2010 L1005665-02 Composite			HR 119 4/18/2010 L1005665-01 Composite			Comparison Criteria				
												NOAA SQG		NYSDEC TOGS 5.1.9		
ANALYTE	**CAS #**	**Units**	**RESULT**		**RL**	**RESULT**		**RL**	**RESULT**		**RL**	**ER-L**	**ER-M**	**Class A**	**Class B**	**Class C**
RIM Organochlorine Pesticides - Mansfield Lab																
4,4'-DDD	72-54-8	mg/kg	ND		0.00167	ND		0.00176	ND		0.0016	0.002	0.02	--	--	--
4,4'-DDE	72-55-9	mg/kg	ND		0.00167	ND		0.00176	ND		0.0016	0.002	0.015	--	--	--
4,4'-DDT	50-29-3	mg/kg	ND		0.00167	ND		0.00176	ND		0.0016	0.001	0.007	--	--	--
TOTAL DDD/E/T		mg/kg	ND		--	ND		--	ND		--	0.00158	0.0461	< 0.003	0.003 - 0.03	> 0.03
Dieldrin	60-57-1	mg/kg	ND		0.00167	ND		0.00176	ND		0.0016	0.00002	0.008	< 0.11	0.11 - 0.48	> 0.48
Endrin	72-20-8	mg/kg	ND		0.00167	ND		0.00176	ND		0.0016	0.00002	0.045	--	--	--
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab																
Acenaphthene	83-32-9	mg/kg	ND		0.0167	ND		0.0176	ND		0.016	0.016	0.5	--	--	--
Acenaphthylene	208-96-8	mg/kg	ND		0.0167	ND		0.0176	ND		0.016	0.044	0.64	--	--	--
Anthracene	120-12-7	mg/kg	ND		0.0167	ND		0.0176	ND		0.016	0.0853	1.1	--	--	--
Benz(a)anthracene	56-55-3	mg/kg	ND		0.0167	ND		0.0176	0.0374		0.016	0.261	1.6	--	--	--
Benzo(a)pyrene	50-32-8	mg/kg	ND		0.0167	ND		0.0176	0.028		0.016	0.43	1.6	--	--	--
Chrysene	218-01-9	mg/kg	ND		0.0167	ND		0.0176	0.0296		0.016	0.384	2.8	--	--	--
Dibenz(a,h)anthracene	53-70-3	mg/kg	ND		0.0167	ND		0.0176	ND		0.016	0.0634	0.26	--	--	--
Fluoranthene	206-44-0	mg/kg	ND		0.0167	ND		0.0176	0.0555		0.016	0.6	5.1	--	--	--
Fluorene	86-73-7	mg/kg	ND		0.0167	ND		0.0176	ND		0.016	0.019	0.54	--	--	--
Naphthalene	91-20-3	mg/kg	0.0416	B	0.0167	0.0287	B	0.0176	0.0467	B	0.016	0.16	2.1	--	--	--
Phenanthrene	85-01-8	mg/kg	ND		0.0167	ND		0.0176	0.0195		0.016	0.24	1.5	--	--	--
Pyrene	129-00-0	mg/kg	ND		0.0167	ND		0.0176	0.0596		0.016	0.665	2.6	--	--	--
TOTAL PAH		mg/kg	0.0416		--	0.0287		--	0.3675		--	4.022	44.792	< 4	4 - 35	> 35
Dioxin																
I-TEF-1988 TEQ (ND=0)	--	mg/kg	NA			3.84E-07		--	7.13E-07		--	--	--	< 4.50E-06	4.50E-06 to 5.00E-05	> 5.00E-05
I-TEF-1988 TEQ (ND=1/2)	--	mg/kg	NA			5.36E-06		--	5.64E-06		--	--	--	< 4.50E-06	4.50E-06 to 5.00E-05	> 5.00E-05
Total Metals - Mansfield Lab																
Arsenic, Total	7440-38-2	mg/kg	7.49	D2	0.052	7.89	D2	0.063	8.1	D2	0.049	8.2	70	< 14	14 - 53	> 53
Cadmium, Total	7440-43-9	mg/kg	0.143	D2	0.052	0.13	D2	0.063	0.404	D2	0.049	1.2	9.6	< 1.2	1.2 - 9.5	> 9.5
Chromium, Total	7440-47-3	mg/kg	22.2	D2	0.207	23.1	D2	0.252	24.3	D2	0.197	81	370	--	--	--
Copper, Total	7440-50-8	mg/kg	12.1	D2	0.103	12.2	D2	0.126	15.4	D2	0.099	34	270	< 33	33 - 207	> 207
Lead, Total	7439-92-1	mg/kg	7.52	D2	0.052	8.16	D2	0.063	37.8	D2	0.049	43.7	218	< 33	33 - 166	> 166
Mercury, Total	7439-97-6	mg/kg	0.026	D5	0.019	0.022	D5	0.021	0.154	D5	0.02	0.15	0.71	< 0.17	0.17 - 1.6	> 1.6
Nickel, Total	7440-02-0	mg/kg	22.4	D2	0.103	23.2	D2	0.126	22.4	D2	0.099	20.9	51.6	--	--	--
Zinc, Total	7440-66-6	mg/kg	71.9	D2	1.03	74.4	D2	1.26	75.9	D2	0.986	150	410	--	--	--

Classifications:

0.159	Indicates value does not exceed ER-L or TOGS 5.1.9 Class A criteria	0.159	Indicates value does not exceed ER-L or TOGS 5.1.9 Class A criteria
12.4	Indicates value exceeds ER-L value but below ER-M value	52	Indicates value is TOGS 5.1.9 Class B
362	Indicates value exceeds ER-M value	2.08	Indicates value is TOGS 5.1.9 Class C

Underlined or underlined/bolded text in a TOGS 5.1.9 Class A, B, or C coded field indicates corresponding ER-L/ER-M exceedance.

RL - Reporting Limit

Qualifiers:

- ND Laboratory Non-detect Value
- -- No criteria given for standard
- B The analyte was detected above the reporting limit in the associated method blank.
- DPE Indicates the presence of a peak in the polychlorinated diphenylether channel that could cause a false positive or an overestimation of the affected analyte(s).

** For HR 119, dioxin 2,3,7,8-TCDF was analyzed with the 17 dioxins and on it's own in a confirmation analysis. The greater of the two values is reported on this table. See Appendix B Parts II & III for complete lab data.

Criteria:

ER-L / ER-M Adapted From: National Oceanic and Atmospheric Administration. *Sediment Quality Guidelines Developed for the National Status and Trends Program.* (June, 1999)

Class A, B, C Adapted From: New York State Department of Environmental Conservation Division of Water. *Technical & Operational Guidance Series (TOGS) 5.1.9 In-water and Riparian Management of Sediment and Dredged Material.* (November, 2004)

TABLE 4b
Hudson River Sediment Samples
PCB Analysis Results
Champlain Hudson Power Express

LOCATION			HR 64		HR 65		HR 66		HR 67 S-1		HR 67 S-2	
SAMPLING DATE			4/28/2010		4/28/2010		4/27/2010		4/27/2010		4/27/2010	
LAB SAMPLE ID			L1006232-10		L1006984-14		L1006232-08		L1006984-11		L1006984-12	
SAMPLE TYPE			Composite		Composite		Composite		Composite		Composite	
ANALYTE	CAS #	Units	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL
General Chemistry - Mansfield Lab												
Solids, Total	NONE	%	58.1	0.1	79.5	0.1	76	0.1	73.2	0.1	72.7	0.1
PCB Congeners (NOAA List) - Mansfield Lab												
Cl2-BZ#8 (Congener #8)	34883-43-7	mg/kg	0.295	0.00118	0.0082	0.000898	0.00389	0.000971	ND	0.00101	ND	0.000979
Cl3-BZ#18 (Congener #18)	37680-65-2	mg/kg	1.060 D10	0.0118	0.0116	0.000898	0.00611	0.000971	ND	0.00101	ND	0.000979
Cl3-BZ#28 (Congener #28)	7012-37-5	mg/kg	1.450 D10	0.0118	0.0176	0.000898	0.0148	0.000971	ND	0.00101	ND	0.000979
Cl4-BZ#44 (Congener #44)	41464-39-5	mg/kg	0.286	0.0118	0.00419	0.000898	0.00182	0.000971	ND	0.00101	ND	0.000979
Cl4-BZ#49 (Congener #49)	41464-40-8	mg/kg	0.459 D10	0.0118	0.00507	0.000898	0.00186	0.000971	ND	0.00101	ND	0.000979
Cl4-BZ#52 (Congener #52)	35693-99-3	mg/kg	0.628 D10	0.00118	0.00693	0.000898	0.00261	0.000971	ND	0.00101	ND	0.000979
Cl4-BZ#66 (Congener #66)	32598-10-0	mg/kg	0.0737	0.00118	0.00144	0.000898	0.00116	0.000971	ND	0.00101	ND	0.000979
Cl5-BZ#101 (Congener #101)	37680-73-2	mg/kg	0.0788	0.00118	0.00208	0.000898	ND	0.000971	ND	0.00101	ND	0.000979
Cl5-BZ#105 (Congener #105)	32598-14-4	mg/kg	0.0244	0.00118	ND	0.000898	ND	0.000971	ND	0.00101	ND	0.000979
Cl5-BZ#118 (Congener #118)	31508-00-6	mg/kg	0.0627	0.00118	0.00124	0.000898	ND	0.000971	ND	0.00101	ND	0.000979
Cl5-BZ#87 (Congener #87)	38380-02-8	mg/kg	0.0113	0.00118	ND	0.000898	ND	0.000971	ND	0.00101	ND	0.000979
Cl6-BZ#128 (Congener #128)	38380-07-3	mg/kg	0.00711	0.00118	ND	0.000898	ND	0.000971	ND	0.00101	ND	0.000979
Cl6-BZ#138 (Congener #138)	35065-28-2	mg/kg	0.0476	0.00118	0.00122	0.000898	ND	0.000971	ND	0.00101	ND	0.000979
Cl6-BZ#153 (Congener #153)	35065-27-1	mg/kg	0.0181	0.00118	ND	0.000898	ND	0.000971	ND	0.00101	ND	0.000979
Cl7-BZ#170 (Congener #170)	35065-30-6	mg/kg	0.00686	0.00118	ND	0.000898	ND	0.000971	ND	0.00101	ND	0.000979
Cl7-BZ#180 (Congener #180)	35065-29-3	mg/kg	0.0109	0.00118	ND	0.000898	ND	0.000971	ND	0.00101	ND	0.000979
Cl7-BZ#183 (Congener #183)	52663-69-1	mg/kg	0.00184	0.00118	ND	0.000898	ND	0.000971	ND	0.00101	ND	0.000979
Cl7-BZ#184 (Congener #184)	74472-48-3	mg/kg	ND	0.00118	ND	0.000898	ND	0.000971	ND	0.00101	ND	0.000979
Cl7-BZ#187 (Congener #187)	52663-68-0	mg/kg	0.00846	0.00118	ND	0.000898	ND	0.000971	ND	0.00101	ND	0.000979
Cl8-BZ#195 (Congener #195)	52663-78-2	mg/kg	ND	0.00118	ND	0.000898	ND	0.000971	ND	0.00101	ND	0.000979
Cl9-BZ#206 (Congener #206)	40186-72-9	mg/kg	0.00453	0.00118	ND	0.000898	ND	0.000971	ND	0.00101	ND	0.000979
Cl10-BZ#209 (Congener #209)	2051-24-3	mg/kg	ND	0.00118	ND	0.000898	ND	0.000971	ND	0.00101	ND	0.000979
TOTAL PCBs			4.5343	--	0.05957	--	0.03225	--	ND	--	ND	--
PCB CALCULATION PER TOGS 5.1.9			9.0686	--	0.11914	--	0.0645	--	ND	--	ND	--

LOCATION	HR 67 S-3		HR 68A		HR 68_REV		HR 69		HR 70		HR 71		Comparison Criteria				
SAMPLING DATE	4/27/2010		4/28/2010		4/28/2010		4/27/2010		4/27/2010		4/27/2010						
LAB SAMPLE ID	L1006984-13		L1006984-15		L1006232-11		L1006984-10		L1006232-03		L1006984-09		NOAA SQG		NYSDEC TOGS 5.1.9		
SAMPLE TYPE	Composite		Composite		Composite		Composite		Composite		Composite						
ANALYTE	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	ER-L	ER-M	Class A	Class B	Class C
General Chemistry - Mansfield Lab																	
Solids, Total	70.7	0.1	77.9	0.1	73.6	0.1	76.4	0.1	74.8	0.1	67.4	0.1	--	--	--	--	--
PCB Congeners (NOAA List) - Mansfield Lab																	
Cl2-BZ#8 (Congener #8)	ND	0.000977	ND	0.000944	0.0021	0.000948	0.00434	0.000928	0.00122	0.001	ND	0.00113	--	--	--	--	--
Cl3-BZ#18 (Congener #18)	ND	0.000977	ND	0.000944	0.00513	0.000948	0.0221	0.000928	0.00187	0.001	ND	0.00113	--	--	--	--	--
Cl3-BZ#28 (Congener #28)	ND	0.000977	ND	0.000944	0.0102	0.000948	0.0152	0.000928	0.00650	0.001	ND	0.00113	--	--	--	--	--
Cl4-BZ#44 (Congener #44)	ND	0.000977	ND	0.000944	0.00158	0.000948	0.00453	0.000928	ND	0.001	ND	0.00113	--	--	--	--	--
Cl4-BZ#49 (Congener #49)	ND	0.000977	ND	0.000944	0.00141	0.000948	0.0047	0.000928	ND	0.001	ND	0.00113	--	--	--	--	--
Cl4-BZ#52 (Congener #52)	ND	0.000977	ND	0.000944	0.00240	0.000948	0.00763	0.000928	0.00124	0.001	ND	0.00113	--	--	--	--	--
Cl4-BZ#66 (Congener #66)	ND	0.000977	ND	0.000944	ND	0.000948	0.0012	0.000928	ND	0.001	ND	0.00113	--	--	--	--	--
Cl5-BZ#101 (Congener #101)	ND	0.000977	ND	0.000944	0.000958	0.000948	0.00157	0.000928	ND	0.001	ND	0.00113	--	--	--	--	--
Cl5-BZ#105 (Congener #105)	ND	0.000977	ND	0.000944	ND	0.000948	ND	0.000928	ND	0.001	ND	0.00113	--	--	--	--	--
Cl5-BZ#118 (Congener #118)	ND	0.000977	ND	0.000944	ND	0.000948	ND	0.000928	ND	0.001	ND	0.00113	--	--	--	--	--
Cl5-BZ#87 (Congener #87)	ND	0.000977	ND	0.000944	ND	0.000948	ND	0.000928	ND	0.001	ND	0.00113	--	--	--	--	--
Cl6-BZ#128 (Congener #128)	ND	0.000977	ND	0.000944	ND	0.000948	ND	0.000928	ND	0.001	ND	0.00113	--	--	--	--	--
Cl6-BZ#138 (Congener #138)	ND	0.000977	ND	0.000944	ND	0.000948	ND	0.000928	ND	0.001	ND	0.00113	--	--	--	--	--
Cl6-BZ#153 (Congener #153)	ND	0.000977	ND	0.000944	ND	0.000948	ND	0.000928	ND	0.001	ND	0.00113	--	--	--	--	--
Cl7-BZ#170 (Congener #170)	ND	0.000977	ND	0.000944	ND	0.000948	ND	0.000928	ND	0.001	ND	0.00113	--	--	--	--	--
Cl7-BZ#180 (Congener #180)	ND	0.000977	ND	0.000944	ND	0.000948	ND	0.000928	ND	0.001	ND	0.00113	--	--	--	--	--
Cl7-BZ#183 (Congener #183)	ND	0.000977	ND	0.000944	ND	0.000948	ND	0.000928	ND	0.001	ND	0.00113	--	--	--	--	--
Cl7-BZ#184 (Congener #184)	ND	0.000977	ND	0.000944	ND	0.000948	ND	0.000928	ND	0.001	ND	0.00113	--	--	--	--	--
Cl7-BZ#187 (Congener #187)	ND	0.000977	ND	0.000944	ND	0.000948	ND	0.000928	ND	0.001	ND	0.00113	--	--	--	--	--
Cl8-BZ#195 (Congener #195)	ND	0.000977	ND	0.000944	ND	0.000948	ND	0.000928	ND	0.001	ND	0.00113	--	--	--	--	--
Cl9-BZ#206 (Congener #206)	ND	0.000977	ND	0.000944	ND	0.000948	ND	0.000928	ND	0.001	ND	0.00113	--	--	--	--	--
Cl10-BZ#209 (Congener #209)	ND	0.000977	ND	0.000944	ND	0.000948	ND	0.000928	ND	0.001	ND	0.00113	--	--	--	--	--
TOTAL PCBs	ND	--	ND	--	0.023778	--	0.06127	--	0.01083	--	ND	--	--	--	--	--	--
PCB CALCULATION PER TOGS 5.1.9	ND	--	ND	--	0.047556	--	0.12254	--	0.02166	--	ND	--	--	--	< 0.1	0.1 - 1	> 1

LOCATION			HR 72		HR 73		HR 73A 0-3'		HR 73A 3'-17'		HR 74	
SAMPLING DATE			4/27/2010		4/26/2010		4/26/2010		4/26/2010		4/26/2010	
LAB SAMPLE ID			L1006232-01		L1006223-16		L1006984-07		L1006984-08		L1006223-13	
SAMPLE TYPE			Composite		Composite		Composite		Composite		Composite	
ANALYTE	CAS #	Units	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL
General Chemistry - Mansfield Lab												
Solids, Total	NONE	%	70.1	0.1	41.8	0.1	61.5	0.1	71.3	0.1	66.3	0.1
PCB Congeners (NOAA List) - Mansfield Lab												
Cl2-BZ#8 (Congener #8)	34883-43-7	mg/kg	ND	0.000982	ND	0.0017	ND	0.00115	ND	0.00103	ND	0.00109
Cl3-BZ#18 (Congener #18)	37680-65-2	mg/kg	0.00493	0.000982	ND	0.0017	ND	0.00115	ND	0.00103	ND	0.00109
Cl3-BZ#28 (Congener #28)	7012-37-5	mg/kg	0.00127	0.000982	ND	0.0017	ND	0.00115	ND	0.00103	ND	0.00109
Cl4-BZ#44 (Congener #44)	41464-39-5	mg/kg	ND	0.000982	ND	0.0017	ND	0.00115	ND	0.00103	ND	0.00109
Cl4-BZ#49 (Congener #49)	41464-40-8	mg/kg	ND	0.000982	ND	0.0017	ND	0.00115	ND	0.00103	ND	0.00109
Cl4-BZ#52 (Congener #52)	35693-99-3	mg/kg	ND	0.000982	ND	0.0017	ND	0.00115	ND	0.00103	ND	0.00109
Cl4-BZ#66 (Congener #66)	32598-10-0	mg/kg	ND	0.000982	ND	0.0017	ND	0.00115	ND	0.00103	ND	0.00109
Cl5-BZ#101 (Congener #101)	37680-73-2	mg/kg	ND	0.000982	ND	0.0017	ND	0.00115	ND	0.00103	ND	0.00109
Cl5-BZ#105 (Congener #105)	32598-14-4	mg/kg	ND	0.000982	ND	0.0017	ND	0.00115	ND	0.00103	ND	0.00109
Cl5-BZ#118 (Congener #118)	31508-00-6	mg/kg	ND	0.000982	ND	0.0017	ND	0.00115	ND	0.00103	ND	0.00109
Cl5-BZ#87 (Congener #87)	38380-02-8	mg/kg	ND	0.000982	ND	0.0017	ND	0.00115	ND	0.00103	ND	0.00109
Cl6-BZ#128 (Congener #128)	38380-07-3	mg/kg	ND	0.000982	ND	0.0017	ND	0.00115	ND	0.00103	ND	0.00109
Cl6-BZ#138 (Congener #138)	35065-28-2	mg/kg	ND	0.000982	ND	0.0017	ND	0.00115	ND	0.00103	ND	0.00109
Cl6-BZ#153 (Congener #153)	35065-27-1	mg/kg	ND	0.000982	ND	0.0017	ND	0.00115	ND	0.00103	ND	0.00109
Cl7-BZ#170 (Congener #170)	35065-30-6	mg/kg	ND	0.000982	ND	0.0017	ND	0.00115	ND	0.00103	ND	0.00109
Cl7-BZ#180 (Congener #180)	35065-29-3	mg/kg	ND	0.000982	ND	0.0017	ND	0.00115	ND	0.00103	ND	0.00109
Cl7-BZ#183 (Congener #183)	52663-69-1	mg/kg	ND	0.000982	ND	0.0017	ND	0.00115	ND	0.00103	ND	0.00109
Cl7-BZ#184 (Congener #184)	74472-48-3	mg/kg	ND	0.000982	ND	0.0017	ND	0.00115	ND	0.00103	ND	0.00109
Cl7-BZ#187 (Congener #187)	52663-68-0	mg/kg	ND	0.000982	ND	0.0017	ND	0.00115	ND	0.00103	ND	0.00109
Cl8-BZ#195 (Congener #195)	52663-78-2	mg/kg	ND	0.000982	ND	0.0017	ND	0.00115	ND	0.00103	ND	0.00109
Cl9-BZ#206 (Congener #206)	40186-72-9	mg/kg	ND	0.000982	ND	0.0017	ND	0.00115	ND	0.00103	ND	0.00109
Cl10-BZ#209 (Congener #209)	2051-24-3	mg/kg	ND	0.000982	ND	0.0017	ND	0.00115	ND	0.00103	ND	0.00109
TOTAL PCBs			0.0062	--	ND	--	ND	--	ND	--	ND	--
PCB CALCULATION PER TOGS 5.1.9			0.0124	--	ND	--	ND	--	ND	--	ND	--

LOCATION	HR 75		HR 76		HR 77 S-1		HR 77 S-2		HR 78		HR 79		Comparison Criteria				
SAMPLING DATE	4/26/2010		4/26/2010		4/26/2010		4/26/2010		4/25/2010		4/25/2010						
LAB SAMPLE ID	L1006984-06		L1006223-11		L1006984-04		L1006984-05		L1006223-08		L1006984-03		NOAA SQG		NYSDEC TOGS 5.1.9		
SAMPLE TYPE	Composite		Composite		Composite		Composite		Composite		Composite						
ANALYTE	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	ER-L	ER-M	Class A	Class B	Class C
General Chemistry - Mansfield Lab																	
Solids, Total	74	0.1	75.2	0.1	73.8	0.1	74.9	0.1	72.4	0.1	72.5	0.1	--	--	--	--	--
PCB Congeners (NOAA List) - Mansfield Lab																	
Cl2-BZ#8 (Congener #8)	ND	0.000977	ND	0.001	0.00148	0.000952	ND	0.000934	ND	0.00104	ND	0.00102	--	--	--	--	--
Cl3-BZ#18 (Congener #18)	ND	0.000977	ND	0.001	0.00768	0.000952	ND	0.000934	0.0037	0.00104	ND	0.00102	--	--	--	--	--
Cl3-BZ#28 (Congener #28)	ND	0.000977	ND	0.001	0.00922	0.000952	ND	0.000934	ND	0.00104	ND	0.00102	--	--	--	--	--
Cl4-BZ#44 (Congener #44)	ND	0.000977	ND	0.001	0.0017	0.000952	ND	0.000934	0.00111	0.00104	ND	0.00102	--	--	--	--	--
Cl4-BZ#49 (Congener #49)	ND	0.000977	ND	0.001	0.00285	0.000952	ND	0.000934	0.0013	0.00104	ND	0.00102	--	--	--	--	--
Cl4-BZ#52 (Congener #52)	0.00149	0.000977	ND	0.001	0.00431	0.000952	ND	0.000934	0.00263	0.00104	ND	0.00102	--	--	--	--	--
Cl4-BZ#66 (Congener #66)	ND	0.000977	ND	0.001	ND	0.000952	ND	0.000934	ND	0.00104	ND	0.00102	--	--	--	--	--
Cl5-BZ#101 (Congener #101)	ND	0.000977	ND	0.001	ND	0.000952	ND	0.000934	ND	0.00104	ND	0.00102	--	--	--	--	--
Cl5-BZ#105 (Congener #105)	ND	0.000977	ND	0.001	ND	0.000952	ND	0.000934	ND	0.00104	ND	0.00102	--	--	--	--	--
Cl5-BZ#118 (Congener #118)	ND	0.000977	ND	0.001	ND	0.000952	ND	0.000934	ND	0.00104	ND	0.00102	--	--	--	--	--
Cl5-BZ#87 (Congener #87)	ND	0.000977	ND	0.001	ND	0.000952	ND	0.000934	ND	0.00104	ND	0.00102	--	--	--	--	--
Cl6-BZ#128 (Congener #128)	ND	0.000977	ND	0.001	ND	0.000952	ND	0.000934	ND	0.00104	ND	0.00102	--	--	--	--	--
Cl6-BZ#138 (Congener #138)	ND	0.000977	ND	0.001	ND	0.000952	ND	0.000934	ND	0.00104	ND	0.00102	--	--	--	--	--
Cl6-BZ#153 (Congener #153)	ND	0.000977	ND	0.001	ND	0.000952	ND	0.000934	ND	0.00104	ND	0.00102	--	--	--	--	--
Cl7-BZ#170 (Congener #170)	ND	0.000977	ND	0.001	ND	0.000952	ND	0.000934	ND	0.00104	ND	0.00102	--	--	--	--	--
Cl7-BZ#180 (Congener #180)	ND	0.000977	ND	0.001	ND	0.000952	ND	0.000934	ND	0.00104	ND	0.00102	--	--	--	--	--
Cl7-BZ#183 (Congener #183)	ND	0.000977	ND	0.001	ND	0.000952	ND	0.000934	ND	0.00104	ND	0.00102	--	--	--	--	--
Cl7-BZ#184 (Congener #184)	ND	0.000977	ND	0.001	ND	0.000952	ND	0.000934	ND	0.00104	ND	0.00102	--	--	--	--	--
Cl7-BZ#187 (Congener #187)	ND	0.000977	ND	0.001	ND	0.000952	ND	0.000934	ND	0.00104	ND	0.00102	--	--	--	--	--
Cl8-BZ#195 (Congener #195)	ND	0.000977	ND	0.001	ND	0.000952	ND	0.000934	ND	0.00104	ND	0.00102	--	--	--	--	--
Cl9-BZ#206 (Congener #206)	ND	0.000977	ND	0.001	ND	0.000952	ND	0.000934	ND	0.00104	ND	0.00102	--	--	--	--	--
Cl10-BZ#209 (Congener #209)	ND	0.000977	ND	0.001	ND	0.000952	ND	0.000934	ND	0.00104	ND	0.00102	--	--	--	--	--
TOTAL PCBs	0.00149	--	ND	--	0.02724	--	ND	--	0.00874	--	ND	--	--	--	--	--	--
PCB CALCULATION PER TOGS 5.1.9	0.00298	--	ND	--	0.05448	--	ND	--	0.01748	--	ND	--	--	--	< 0.1	0.1 - 1	> 1

Classifications:

0.159	Indicates value does not exceed ER-L or TOGS 5.1.9 Class A criteria
12.4	Indicates value exceeds ER-L value but below ER-M value
362	Indicates value exceeds ER-M value
0.159	Indicates value does not exceed ER-L or TOGS 5.1.9 Class A criteria
52	Indicates value is TOGS 5.1.9 Class B
2.08	Indicates value is TOGS 5.1.9 Class C

Underlined or underlined/bolded text in a TOGS 5.1.9 Class A, B, or C coded field indicates corresponding ER-L/ER-M exceedance.

RL - Reporting Limit

Qualifiers:

ND Laboratory Non-detect Value

-- No criteria given for standard

Criteria:

ER-L / ER-M Adapted From: National Oceanic and Atmospheric Administration. *Sediment Quality Guidelines Developed for the National Status and Trends Program* (June, 1999)

Class A, B, C Adapted From: New York State Department of Environmental Conservation Division of Water. *Technical & Operational Guidance Series (TOGS) 5.1.9 In-water and Riparian Management of Sediment and Dredged Material.* (November, 2004)

TABLE 4b
Hudson River Sediment Samples
PCB Analysis Results
Champlain Hudson Power Express

LOCATION			HR 80		HR 81		HR082		HR 083		HR084 0-5'		HR084 5'-15.8'		HR 085		HR 86		HR 88		HR 89		HR090		Comparison Criteria				
SAMPLING DATE			4/25/2010		4/25/2010		4/23/2010		4/23/2010		4/23/2010		4/23/2010		4/23/2010		4/24/2010		4/24/2010		4/24/2010		4/22/2010		NOAA SQG		NYSDEC TOGS 5.1.9		
LAB SAMPLE ID			L1006223-06 Composite		L1006984-02 Composite		L1006002-01 Composite		L1006984-29 Composite		L1006002-03 Composite		L1006002-04 Composite		L1006984-30 Composite		L1006223-03 Composite		L1006223-04 Composite		L1006984-01 Composite		L1005999-20 Composite						
ANALYTE	CAS #	Units	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	ER-L	ER-M	Class A	Class B	Class C
General Chemistry - Mansfield Lab																													
Solids, Total	NONE	%	61.8	0.1	78.4	0.1	65	0.1	58.7	0.1	60.9	0.1	63.5	0.1	55.4	0.1	56.9	0.1	57.7	0.1	57.5	0.1	58.1	0.1	--	--	--	--	--
PCB Congeners (NOAA List) - Mansfield Lab																													
Cl2-BZ#8 (Congener #8)	34883-43-7	mg/kg	ND	0.00117	0.00111	0.000889	0.127	0.00116	0.0142	0.00121	ND	0.00124	ND	0.00113	0.0122	0.00128	0.00345	0.00127	0.0467	0.00122	ND	0.00122	0.0147	0.00121	--	--	--	--	--
Cl3-BZ#18 (Congener #18)	37680-65-2	mg/kg	ND	0.00117	0.0047	0.000889	0.794 D4	0.00465	0.0951	0.00121	ND	0.00124	0.00142	0.00113	0.109	0.00128	0.027	0.00127	0.225	0.00122	ND	0.00122	0.121	0.00121	--	--	--	--	--
Cl3-BZ#28 (Congener #28)	7012-37-5	mg/kg	ND	0.00117	0.00762	0.000889	0.964 D4	0.00465	0.123	0.00121	ND	0.00124	0.00123	0.00113	0.141	0.00128	0.0356	0.00127	0.245	0.00122	ND	0.00122	0.145	0.00121	--	--	--	--	--
Cl4-BZ#44 (Congener #44)	41464-39-5	mg/kg	ND	0.00117	0.00154	0.000889	0.0891	0.00465	0.0366	0.00121	ND	0.00124	ND	0.00113	0.065	0.00128	0.0121	0.00127	0.0421	0.00122	ND	0.00122	0.0207	0.00121	--	--	--	--	--
Cl4-BZ#49 (Congener #49)	41464-40-8	mg/kg	ND	0.00117	0.00192	0.000889	0.413 D4	0.00465	0.056	0.00121	ND	0.00124	ND	0.00113	0.0609	0.00128	0.0132	0.00127	0.0924	0.00122	ND	0.00122	0.0591	0.00121	--	--	--	--	--
Cl4-BZ#52 (Congener #52)	35693-99-3	mg/kg	ND	0.00117	0.00275	0.000889	0.533 D4	0.00116	0.088	0.00121	ND	0.00124	ND	0.00113	0.112	0.00128	0.0258	0.00127	0.162	0.00122	ND	0.00122	0.0893	0.00121	--	--	--	--	--
Cl4-BZ#66 (Congener #66)	32598-10-0	mg/kg	ND	0.00117	ND	0.000889	0.0529	0.00116	0.02	0.00121	ND	0.00124	ND	0.00113	0.0342	0.00128	0.00595	0.00127	0.0204	0.00122	ND	0.00122	0.0135	0.00121	--	--	--	--	--
Cl5-BZ#101 (Congener #101)	37680-73-2	mg/kg	ND	0.00117	ND	0.000889	0.0641	0.00116	0.0371	0.00121	ND	0.00124	ND	0.00113	0.0795	0.00128	0.0121	0.00127	0.0392	0.00122	ND	0.00122	0.0179	0.00121	--	--	--	--	--
Cl5-BZ#105 (Congener #105)	32598-14-4	mg/kg	ND	0.00117	ND	0.000889	0.0153	0.00116	0.00626	0.00121	ND	0.00124	ND	0.00113	0.0113	0.00128	0.00181	0.00127	0.00637	0.00122	ND	0.00122	0.00332	0.00121	--	--	--	--	--
Cl5-BZ#118 (Congener #118)	31508-00-6	mg/kg	ND	0.00117	ND	0.000889	0.0453	0.00116	0.0199	0.00121	ND	0.00124	ND	0.00113	0.0553	0.00128	0.00857	0.00127	0.0276	0.00122	ND	0.00122	0.0123	0.00121	--	--	--	--	--
Cl5-BZ#87 (Congener #87)	38380-02-8	mg/kg	ND	0.00117	ND	0.000889	0.0105	0.00116	0.00548	0.00121	ND	0.00124	ND	0.00113	0.0125	0.00128	0.0019	0.00127	0.00514	0.00122	ND	0.00122	0.00176	0.00121	--	--	--	--	--
Cl6-BZ#128 (Congener #128)	38380-07-3	mg/kg	ND	0.00117	ND	0.000889	0.0053	0.00116	0.00666	0.00121	ND	0.00124	ND	0.00113	0.0135	0.00128	0.00243	0.00127	0.00553	0.00122	ND	0.00122	0.00223	0.00121	--	--	--	--	--
Cl6-BZ#138 (Congener #138)	35065-28-2	mg/kg	ND	0.00117	ND	0.000889	0.0325	0.00116	0.025	0.00121	ND	0.00124	ND	0.00113	0.0616	0.00128	0.011	0.00127	0.0268	0.00122	ND	0.00122	0.00897	0.00121	--	--	--	--	--
Cl6-BZ#153 (Congener #153)	35065-27-1	mg/kg	ND	0.00117	ND	0.000889	0.0153	0.00116	0.0175	0.00121	ND	0.00124	ND	0.00113	0.0435	0.00128	0.0053	0.00127	0.0128	0.00122	ND	0.00122	0.00556	0.00121	--	--	--	--	--
Cl7-BZ#170 (Congener #170)	35065-30-6	mg/kg	ND	0.00117	ND	0.000889	0.00604	0.00116	0.00448	0.00121	ND	0.00124	ND	0.00113	0.00755	0.00128	0.00242	0.00127	0.00484	0.00122	ND	0.00122	0.00286	0.00121	--	--	--	--	--
Cl7-BZ#180 (Congener #180)	35065-29-3	mg/kg	ND	0.00117	ND	0.000889	0.00747	0.00116	0.00642	0.00121	ND	0.00124	ND	0.00113	0.0124	0.00128	0.00224	0.00127	0.00603	0.00122	ND	0.00122	0.00236	0.00121	--	--	--	--	--
Cl7-BZ#183 (Congener #183)	52663-69-1	mg/kg	ND	0.00117	ND	0.000889	0.00127	0.00116	ND	0.00121	ND	0.00124	ND	0.00113	0.00289	0.00128	ND	0.00127	0.00127	0.00122	ND	0.00122	ND	0.00121	--	--	--	--	--
Cl7-BZ#184 (Congener #184)	74472-48-3	mg/kg	ND	0.00117	ND	0.000889	ND	0.00116	ND	0.00121	ND	0.00124	ND	0.00113	ND	0.00128	-	-	-	-	ND	0.00122	ND	0.00121	--	--	--	--	--
Cl7-BZ#187 (Congener #187)	52663-68-0	mg/kg	ND	0.00117	ND	0.000889	0.00884	0.00116	0.00456	0.00121	ND	0.00124	ND	0.00113	0.00892	0.00128	0.00164	0.00127	0.00469	0.00122	ND	0.00122	0.00203	0.00121	--	--	--	--	--
Cl8-BZ#195 (Congener #195)	52663-78-2	mg/kg	ND	0.00117	ND	0.000889	ND	0.00116	ND	0.00121	ND	0.00124	ND	0.00113	ND	0.00128	-	-	-	-	ND	0.00122	ND	0.00121	--	--	--	--	--
Cl9-BZ#206 (Congener #206)	40186-72-9	mg/kg	ND	0.00117	ND	0.000889	0.00311	0.00116	0.00263	0.00121	ND	0.00124	ND	0.00113	0.00301	0.00128	ND	0.00127	0.00244	0.00122	ND	0.00122	ND	0.00121	--	--	--	--	--
Cl10-BZ#209 (Congener #209)	2051-24-3	mg/kg	ND	0.00117	ND	0.000889	0.00151	0.00116	0.00335	0.00121	ND	0.00124	ND	0.00113	0.0023	0.00128	0.00136	0.00127	0.00289	0.00122	ND	0.00122	ND	0.00121	--	--	--	--	--
TOTAL PCBs			ND	--	0.01964	--	3.18954	--	0.57224	--	ND	--	0.00265	--	0.84857	--	0.17387	--	0.9792	--	ND	--	0.52259	--	--	--	--	--	--
PCB CALCULATION PER TOGS 5.1.9			ND	--	0.03928	--	6.37908	--	1.14448	--	ND	--	0.0053	--	1.69714	--	0.34774	--	1.9584	--	ND	--	1.04518	--	--	--	< 0.1	0.1 - 1	> 1

LOCATION			HR 091		HR092		HR 093		HR094		HR 095		HR096		HR 097 S-1		HR 097 S-2		HR 097 S-3		HR098		HR 099		Comparison Criteria				
SAMPLING DATE			4/22/2010		4/22/2010		4/22/2010		4/22/2010		4/21/2010		4/21/2010		4/21/2010		4/21/2010		4/21/2010		4/21/2010		4/20/2010		NOAA SQG		NYSDEC TOGS 5.1.9		
LAB SAMPLE ID			L1006984-28 Composite		L1005999-18 Composite		L1006984-27 Composite		L1005999-16 Composite		L1006984-26 Composite		L1005999-14 Composite		L1006984-23 Composite		L1006984-24 Composite		L1006984-25 Composite		L1005999-10 Composite		L1006984-22 Composite						
ANALYTE	CAS #	Units	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	ER-L	ER-M	Class A	Class B	Class C
General Chemistry - Mansfield Lab																													
Solids, Total	NONE	%	61.8	0.1	54.1	0.1	57.7	0.1	64.1	0.1	57.2	0.1	53.3	0.1	47.4	0.1	47.3	0.1	48.9	0.1	49.5	0.1	51.2	0.1	--	--	--	--	--
PCB Congeners (NOAA List) - Mansfield Lab																													
Cl2-BZ#8 (Congener #8)	34883-43-7	mg/kg	ND	0.00115	0.00345	0.00132	0.0073	0.00128	ND	0.00115	ND	0.00124	0.00653	0.00142	0.0997	0.00159	0.101	0.00147	0.0717	0.00153	ND	0.00142	0.0178	0.00142	--	--	--	--	--
Cl3-BZ#18 (Congener #18)	37680-65-2	mg/kg	ND	0.00115	0.0102	0.00132	0.0498	0.00128	ND	0.00115	ND	0.00124	0.0298	0.00142	0.568 D4	0.00634	0.719 D4	0.00589	0.547 D4	0.00613	ND	0.00142	0.0981	0.00142	--	--	--	--	--
Cl3-BZ#28 (Congener #28)	7012-37-5	mg/kg	ND	0.00115	0.0243	0.00132	0.0561	0.00128	ND	0.00115	ND	0.00124	0.0639	0.00142	1.12 D4	0.00634	0.917 D4	0.00589	0.732 D4	0.00613	ND	0.00142	0.181	0.00142	--	--	--	--	--
Cl4-BZ#44 (Congener #44)	41464-39-5	mg/kg	ND	0.00115	0.0107	0.00132	0.00544	0.00128	ND	0.00115	ND	0.00124	0.016	0.00142	0.198	0.00159	0.165	0.00147	0.119	0.00153	ND	0.00142	0.0327	0.00142	--	--	--	--	--
Cl4-BZ#49 (Congener #49)	41464-40-8	mg/kg	ND	0.00115	0.0141	0.00132	0.0228	0.00128	ND	0.00115	ND	0.00124	0.0214	0.00142	0.318	0.00159	0.301	0.00147	0.219	0.00153	ND	0.00142	0.0601	0.00142	--	--	--	--	--
Cl4-BZ#52 (Congener #52)	35693-99-3	mg/kg	ND	0.00115	0.0248	0.00132	0.0303	0.00128	ND	0.00115	ND	0.00124	0.0293	0.00142	0.418 D4	0.00634	0.4 D4	0.00589	0.291	0.00153	ND	0.00142	0.0735	0.00142	--	--	--	--	--
Cl4-BZ#66 (Congener #66)	32598-10-0	mg/kg	ND	0.00115	0.00397	0.00132	0.00516	0.00128	ND	0.00115	ND	0.00124	0.00974	0.00142	0.13	0.00159	0.111	0.00147	0.0862	0.00153	ND	0.00142	0.0265	0.00142	--	--	--	--	--
Cl5-BZ#101 (Congener #101)	37680-73-2	mg/kg	ND	0.00115	0.00747	0.00132	0.00592	0.00128	ND	0.00115	ND	0.00124	0.00953	0.00142	0.11	0.00159	0.0922	0.00147	0.0704	0.00153	ND	0.00142	0.0201	0.00142	--	--	--	--	--
Cl5-BZ#105 (Congener #105)	32598-14-4	mg/kg	ND	0.00115	0.00167	0.00132	ND	0.00128	ND	0.00115	ND	0.00124	0.00192	0.00142	0.0202	0.00159	0.0162	0.00147	0.0149	0.00153	ND	0.00142	0.00348	0.00142	--	--	--	--	--
Cl5-BZ#118 (Congener #118)	31508-00-6	mg/kg	ND	0.00115	0.00548	0.00132	0.00331	0.00128	ND	0.00115	ND	0.00124	0.00743	0.00142	0.0728	0.00159	0.054	0.00147	0.0489	0.00153	ND	0.00142	0.0148	0.00142	--	--	--	--	--
Cl5-BZ#87 (Congener #87)	38380-02-8	mg/kg	ND	0.00115	0.00178	0.00132	ND	0.00128	ND	0.00115	ND	0.00124	0.002	0.00142	0.0126	0.00159	0.0107	0.00147	0.0102	0.00153	ND	0.00142	0.00205	0.00142	--	--	--	--	--
Cl6-BZ#128 (Congener #128)	38380-07-3	mg/kg	ND	0.00115	ND	0.00132	ND	0.00128	ND	0.00115	ND	0.00124	0.0015	0.00142	0.0113	0.00159	0.011	0.00147	0.00705	0.00153	ND	0.00142	0.00183	0.00142	--	--	--	--	--
Cl6-BZ#138 (Congener #138)	35065-28-2	mg/kg	ND	0.00115	0.00534	0.00132	0.00266	0.00128	ND	0.00115	ND	0.00124	0.00564	0.00142	0.0448	0.00159	0.034	0.00147	0.0274	0.00153	ND	0.00142	0.0073	0.00142	--	--	--	--	--
Cl6-BZ#153 (Congener #153)	35065-27-1	mg/kg	ND	0.00115	0.00356	0.00132	0.00267	0.00128	ND	0.00115	ND	0.00124	0.00401	0.00142	0.0323	0.00159	0.0268	0.00147	0.0213	0.00153	ND	0.00142	0.00652	0.00142	--	--	--	--	--
Cl7-BZ#170 (Congener #170)	35065-30-6	mg/kg	ND	0.00115	0.00133	0.00132	ND	0.00128	ND	0.00115	ND	0.00124	ND	0.00142	0.011	0.00159	0.00896	0.00147	0.00689	0.00153	ND	0.00142	0.00204	0.00142	--	--	--	--	--
Cl7-BZ#180 (Congener #180)	35065-29-3	mg/kg	ND	0.00115	0.0019	0.00132	ND	0.00128	ND	0.00115	ND	0.00124	0.00202	0.00142	0.0131	0.00159	0.0105	0.00147	0.0087	0.00153	ND	0.00142	0.00287	0.00142	--	--	--	--	--
Cl7-BZ#183 (Congener #183)	52663-69-1	mg/kg	ND	0.00115	ND	0.00132	ND	0.00128	ND	0.00115	ND	0.00124	ND	0.00142	0.00317	0.00159	0.00223	0.00147	0.00192	0.00153	ND	0.00142	ND	0.00142	--	--	--	--	--
Cl7-BZ#184 (Congener #184)	74472-48-3	mg/kg	ND	0.00115	ND	0.00132	ND	0.00128	ND	0.00115	ND	0.00124	ND	0.00142	ND	0.00159	ND	0.00147	ND	0.00153	ND	0.00142	ND	0.00142	--	--	--	--	--
Cl7-BZ#187 (Congener #187)	52663-68-0	mg/kg	ND	0.00115	ND	0.00132	ND	0.00128	ND	0.00115	ND	0.00124	0.00158	0.00142	0.0102	0.00159	0.00904	0.00147	0.00786	0.00153	ND	0.00142	0.0022	0.00142	--	--	--	--	--
Cl8-BZ#195 (Congener #195)	52663-78-2	mg/kg	ND	0.00115	ND	0.00132	ND	0.00128	ND	0.00115	ND	0.00124	ND	0.00142	ND	0.00159	ND	0.00147	ND	0.00153	ND	0.00142	ND	0.00142	--	--	--	--	--
Cl9-BZ#206 (Congener #206)	40186-72-9	mg/kg	ND	0.00115	0.00191	0.00132	ND	0.00128	ND	0.00115	ND	0.00124	ND	0.00142	0.00595	0.00159	0.00493	0.00147	0.00352	0.00153	ND	0.00142	ND	0.00142	--	--	--	--	--
Cl10-BZ#209 (Congener #209)	2051-24-3	mg/kg	ND	0.00115	0.00225	0.00132	ND	0.00128	ND	0.00115	ND	0.00124	ND	0.00142	0.00264	0.00159	0.00202	0.00147	0.00192	0.00153	ND	0.00142	ND	0.00142	--	--	--	--	--
TOTAL PCBs			ND	--	0.12421	--	0.19146	--	ND	--	ND	--	0.2123	--	3.20176	--	2.99658	--	2.29686	--	ND	--	0.55289	--	--	--	--	--	--
PCB CALCULATION PER TOGS 5.1.9			ND	--	0.24842	--	0.38292	--	ND	--	ND	--	0.4246	--	6.40352	--	5.99316	--	4.59372	--	ND	--	1.10578	--	--	--	< 0.1	0.1 - 1	> 1

Classifications:

0.159	Indicates value does not exceed ER-L or TOGS 5.1.9 Class A criteria	0.159	Indicates value does not exceed ER-L or TOGS 5.1.9 Class A criteria
12.4	Indicates value exceeds ER-L value but below ER-M value	52	Indicates value is TOGS 5.1.9 Class B
362	Indicates value exceeds ER-M value	2.08	Indicates value is TOGS 5.1.9 Class C

Underlined or underlined/bolded text in a TOGS 5.1.9 Class A, B, or C coded field indicates corresponding ER-L/ER-M exceedance.

Qualifiers:

ND Laboratory Non-detect Value

-- No criteria given for standard

Criteria:

ER-L / ER-M Adapted From: National Oceanic and Atmospheric Administration. *Sediment Quality Guidelines Developed for the National Status and Trends Program* (June, 1999)

Class A, B, C Adapted From: New York State Department of Environmental Conservation Division of Water. *Technical & Operational Guidance Series (TOGS) 5.1.9 In-water and Riparian Management of Sediment and Dredged Material.* (November, 2004)

TABLE 4b
Hudson River Sediment Samples
PCB Analysis Results
Champlain Hudson Power Express

ANALYTE	CAS #	Units	HR100		HR 101		HR102		HR 103		HR 103 S2	
SAMPLING DATE			4/21/2010		4/20/2010		4/20/2010		4/20/2010		4/20/2010	
LAB SAMPLE ID			L1005999-08 Composite		L1006984-16 Composite		L1005999-02 Composite		L1006984-17 Composite		L1006984-18 Composite	
			RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL
General Chemistry - Mansfield Lab												
Solids, Total	NONE	%	49.2	0.1	49.9	0.1	48.3	0.1	47.6	0.1	45.4	0.1
PCB Congeners (NOAA List) - Mansfield Lab												
Cl2-BZ#8 (Congener #8)	34883-43-7	mg/kg	ND	0.00147	0.102	0.00145	0.00169	0.00155	0.0199	0.00146	0.0216	0.00164
Cl3-BZ#18 (Congener #18)	37680-65-2	mg/kg	ND	0.00147	0.868 D4	0.00579	0.00858	0.00155	0.0765	0.00146	0.0861	0.00164
Cl3-BZ#28 (Congener #28)	7012-37-5	mg/kg	ND	0.00147	1.35 D4	0.00579	0.015	0.00155	0.197	0.00146	0.226	0.00164
Cl4-BZ#44 (Congener #44)	41464-39-5	mg/kg	ND	0.00147	0.311	0.00145	0.00434	0.00155	0.0572	0.00146	0.0669	0.00164
Cl4-BZ#49 (Congener #49)	41464-40-8	mg/kg	ND	0.00147	0.464 D4	0.00579	0.00635	0.00155	0.0646	0.00146	0.0738	0.00164
Cl4-BZ#52 (Congener #52)	35693-99-3	mg/kg	ND	0.00147	0.574 D4	0.00579	0.00736	0.00155	0.0811	0.00146	0.0944	0.00164
Cl4-BZ#66 (Congener #66)	32598-10-0	mg/kg	ND	0.00147	0.162	0.00145	0.00256	0.00155	0.0411	0.00146	0.0469	0.00164
Cl5-BZ#101 (Congener #101)	37680-73-2	mg/kg	ND	0.00147	0.138	0.00145	0.00286	0.00155	0.033	0.00146	0.0373	0.00164
Cl5-BZ#105 (Congener #105)	32598-14-4	mg/kg	ND	0.00147	0.0224	0.00145	ND	0.00155	0.00628	0.00146	0.00742	0.00164
Cl5-BZ#118 (Congener #118)	31508-00-6	mg/kg	ND	0.00147	0.0949	0.00145	0.00169	0.00155	0.0256	0.00146	0.0289	0.00164
Cl5-BZ#87 (Congener #87)	38380-02-8	mg/kg	ND	0.00147	0.0158	0.00145	ND	0.00155	0.00366	0.00146	0.00497	0.00164
Cl6-BZ#128 (Congener #128)	38380-07-3	mg/kg	ND	0.00147	0.0138	0.00145	ND	0.00155	0.00309	0.00146	0.00374	0.00164
Cl6-BZ#138 (Congener #138)	35065-28-2	mg/kg	ND	0.00147	0.0566	0.00145	0.00169	0.00155	0.0134	0.00146	0.016	0.00164
Cl6-BZ#153 (Congener #153)	35065-27-1	mg/kg	ND	0.00147	0.0395	0.00145	ND	0.00155	0.0148	0.00146	0.0149	0.00164
Cl7-BZ#170 (Congener #170)	35065-30-6	mg/kg	ND	0.00147	0.00977	0.00145	ND	0.00155	0.00354	0.00146	0.00484	0.00164
Cl7-BZ#180 (Congener #180)	35065-29-3	mg/kg	ND	0.00147	0.0154	0.00145	ND	0.00155	0.00577	0.00146	0.00639	0.00164
Cl7-BZ#183 (Congener #183)	52663-69-1	mg/kg	ND	0.00147	0.00284	0.00145	ND	0.00155	ND	0.00146	ND	0.00164
Cl7-BZ#184 (Congener #184)	74472-48-3	mg/kg	ND	0.00147	ND	0.00145	ND	0.00155	ND	0.00146	ND	0.00164
Cl7-BZ#187 (Congener #187)	52663-68-0	mg/kg	ND	0.00147	0.0119	0.00145	ND	0.00155	0.00459	0.00146	0.00495	0.00164
Cl8-BZ#195 (Congener #195)	52663-78-2	mg/kg	ND	0.00147	ND	0.00145	ND	0.00155	ND	0.00146	ND	0.00164
Cl9-BZ#206 (Congener #206)	40186-72-9	mg/kg	ND	0.00147	0.00674	0.00145	ND	0.00155	0.00352	0.00146	0.00269	0.00164
Cl10-BZ#209 (Congener #209)	2051-24-3	mg/kg	ND	0.00147	0.00293	0.00145	ND	0.00155	0.00198	0.00146	0.00214	0.00164
TOTAL PCBs			ND	--	4.26158	--	0.05212	--	0.65663	--	0.74994	--
PCB CALCULATION PER TOGS 5.1.9			ND	--	8.52316	--	0.10424	--	1.31326	--	1.49988	--

ANALYTE	HR 104		HR 105		HR 106		HR 107		HR 108		HR 109		Comparison Criteria				
SAMPLING DATE	4/20/2010		4/20/2010		4/20/2010		4/18/2010		4/18/2010		4/19/2010		NOAA SQG		NYSDEC TOGS 5.1.9		
LAB SAMPLE ID	L1006984-19 Composite		L1006984-20 Composite		L1006984-21 Composite		L1005665-12 Composite		L1005665-11 Composite		L1005665-10 Composite						
	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	ER-L	ER-M	Class A	Class B	Class C
General Chemistry - Mansfield Lab																	
Solids, Total	53.6	0.1	51.1	0.1	54.9	0.1	50.4	0.1	47.6	0.1	51	0.1	--	--	--	--	--
PCB Congeners (NOAA List) - Mansfield Lab																	
Cl2-BZ#8 (Congener #8)	0.00585	0.00134	0.0175	0.00141	0.0151	0.00135	ND	0.00178	ND	0.00191	ND	0.00171	--	--	--	--	--
Cl3-BZ#18 (Congener #18)	0.0541	0.00134	0.135	0.00141	0.122	0.00135	0.00246	0.00178	ND	0.00191	ND	0.00171	--	--	--	--	--
Cl3-BZ#28 (Congener #28)	0.0935	0.00134	0.218	0.00141	0.188	0.00135	0.00699	0.00178	ND	0.00191	ND	0.00171	--	--	--	--	--
Cl4-BZ#44 (Congener #44)	0.0369	0.00134	0.0623	0.00141	0.0579	0.00135	0.00198	0.00178	ND	0.00191	ND	0.00171	--	--	--	--	--
Cl4-BZ#49 (Congener #49)	0.0334	0.00134	0.068	0.00141	0.0565	0.00135	0.00212	0.00178	ND	0.00191	ND	0.00171	--	--	--	--	--
Cl4-BZ#52 (Congener #52)	0.0463	0.00134	0.0924	0.00141	0.0804	0.00135	0.00251	0.00178	ND	0.00191	ND	0.00171	--	--	--	--	--
Cl4-BZ#66 (Congener #66)	0.0235	0.00134	0.039	0.00141	0.0308	0.00135	0.00178	0.00178	ND	0.00191	ND	0.00171	--	--	--	--	--
Cl5-BZ#101 (Congener #101)	0.0187	0.00134	0.0308	0.00141	0.0262	0.00135	ND	0.00178	ND	0.00191	ND	0.00171	--	--	--	--	--
Cl5-BZ#105 (Congener #105)	0.00281	0.00134	0.00529	0.00141	0.0046	0.00135	ND	0.00178	ND	0.00191	ND	0.00171	--	--	--	--	--
Cl5-BZ#118 (Congener #118)	0.0133	0.00134	0.02	0.00141	0.0169	0.00135	ND	0.00178	ND	0.00191	ND	0.00171	--	--	--	--	--
Cl5-BZ#87 (Congener #87)	0.0024	0.00134	0.00345	0.00141	0.00284	0.00135	ND	0.00178	ND	0.00191	ND	0.00171	--	--	--	--	--
Cl6-BZ#128 (Congener #128)	0.00213	0.00134	0.00332	0.00141	0.00249	0.00135	ND	0.00178	ND	0.00191	ND	0.00171	--	--	--	--	--
Cl6-BZ#138 (Congener #138)	0.00845	0.00134	0.0129	0.00141	0.0115	0.00135	ND	0.00178	ND	0.00191	ND	0.00171	--	--	--	--	--
Cl6-BZ#153 (Congener #153)	0.0085	0.00134	0.0102	0.00141	0.0095	0.00135	ND	0.00178	ND	0.00191	ND	0.00171	--	--	--	--	--
Cl7-BZ#170 (Congener #170)	0.00205	0.00134	0.00318	0.00141	0.00254	0.00135	ND	0.00178	ND	0.00191	ND	0.00171	--	--	--	--	--
Cl7-BZ#180 (Congener #180)	0.00305	0.00134	0.00406	0.00141	0.00381	0.00135	ND	0.00178	ND	0.00191	ND	0.00171	--	--	--	--	--
Cl7-BZ#183 (Congener #183)	ND	0.00134	ND	0.00141	ND	0.00135	ND	0.00178	ND	0.00191	ND	0.00171	--	--	--	--	--
Cl7-BZ#184 (Congener #184)	ND	0.00134	ND	0.00141	ND	0.00135	ND	0.00178	ND	0.00191	ND	0.00171	--	--	--	--	--
Cl7-BZ#187 (Congener #187)	0.00243	0.00134	0.00351	0.00141	0.00276	0.00135	ND	0.00178	ND	0.00191	ND	0.00171	--	--	--	--	--
Cl8-BZ#195 (Congener #195)	ND	0.00134	ND	0.00141	ND	0.00135	ND	0.00178	ND	0.00191	ND	0.00171	--	--	--	--	--
Cl9-BZ#206 (Congener #206)	ND	0.00134	0.00155	0.00141	ND	0.00135	ND	0.00178	ND	0.00191	ND	0.00171	--	--	--	--	--
Cl10-BZ#209 (Congener #209)	ND	0.00134	ND	0.00141	ND	0.00135	ND	0.00178	ND	0.00191	ND	0.00171	--	--	--	--	--
TOTAL PCBs	0.35737	--	0.73046	--	0.63384	--	0.01784	--	ND	--	ND	--	--	--	--	--	--
PCB CALCULATION PER TOGS 5.1.9	0.71474	--	1.46092	--	1.26768	--	0.03568	--	ND	--	ND	--	--	--	< 0.1	0.1 - 1	> 1

ANALYTE	CAS #	Units	HR 110		HR 112		HR 113		HR 114		HR 115	
SAMPLING DATE			4/19/2010		4/19/2010		4/19/2010		4/19/2010		4/18/2010	
LAB SAMPLE ID			L1005665-09 Composite		L1005665-07 Composite		L1005665-08 Composite		L1005665-06 Composite		L1005665-05 Composite	
			RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL
General Chemistry - Mansfield Lab												
Solids, Total	NONE	%	48.1	0.1	47.8	0.1	49.9	0.1	55.3	0.1	55.4	0.1
PCB Congeners (NOAA List) - Mansfield Lab												
Cl2-BZ#8 (Congener #8)	34883-43-7	mg/kg	ND	0.00185	ND	0.00188	0.00185	0.00181	ND	0.00156	ND	0.00159
Cl3-BZ#18 (Congener #18)	37680-65-2	mg/kg	ND	0.00185	ND	0.00188	0.0061	0.00181	ND	0.00156	0.00205	0.00159
Cl3-BZ#28 (Congener #28)	7012-37-5	mg/kg	ND	0.00185	ND	0.00188	0.0152	0.00181	ND	0.00156	0.00524	0.00159
Cl4-BZ#44 (Congener #44)	41464-39-5	mg/kg	ND	0.00185	ND	0.00188	0.00453	0.00181	ND	0.00156	0.00182	0.00159
Cl4-BZ#49 (Congener #49)	41464-40-8	mg/kg	ND	0.00185	ND	0.00188	0.00545	0.00181	ND	0.00156	0.00203	0.00159
Cl4-BZ#52 (Congener #52)	35693-99-3	mg/kg	ND	0.00185	ND	0.00188	0.00713	0.00181	ND	0.00156	0.00301	0.00159
Cl4-BZ#66 (Congener #66)	32598-10-0	mg/kg	ND	0.00185	ND	0.00188	0.00422	0.00181	ND	0.00156	ND	0.00159
Cl5-BZ#101 (Congener #101)	37680-73-2	mg/kg	ND	0.00185	ND	0.00188	0.0033	0.00181	ND	0.00156	0.00173	0.00159
Cl5-BZ#105 (Congener #105)	32598-14-4	mg/kg	ND	0.00185	ND	0.00188	ND	0.00181	ND	0.00156	ND	0.00159
Cl5-BZ#118 (Congener #118)	31508-00-6	mg/kg	ND	0.00185	ND	0.00188	0.00247	0.00181	ND	0.00156	ND	0.00159
Cl5-BZ#87 (Congener #87)	38380-02-8	mg/kg	ND	0.00185	ND	0.00188	ND	0.00181	ND	0.00156	ND	0.00159
Cl6-BZ#128 (Congener #128)	38380-07-3	mg/kg	ND	0.00185	ND	0.00188	ND	0.00181	ND	0.00156	ND	0.00159
Cl6-BZ#138 (Congener #138)	35065-28-2	mg/kg	ND	0.00185	ND	0.00188	0.0024	0.00181	ND	0.00156	ND	0.00159
Cl6-BZ#153 (Congener #153)	35065-27-1	mg/kg	ND	0.00185	ND	0.00188	0.00187	0.00181	ND	0.00156	0.00172	0.00159
Cl7-BZ#170 (Congener #170)	35065-30-6	mg/kg	ND	0.00185	ND	0.00188	ND	0.00181	ND	0.00156	ND	0.00159
Cl7-BZ#180 (Congener #180)	35065-29-3	mg/kg	ND	0.00185	ND	0.00188	ND	0.00181	ND	0.00156	ND	0.00159
Cl7-BZ#183 (Congener #183)	52663-69-1	mg/kg	ND	0.00185	ND	0.00188	ND	0.00181	ND	0.00156	ND	0.00159
Cl7-BZ#184 (Congener #184)	74472-48-3	mg/kg	ND	0.00185	ND	0.00188	ND	0.00181	ND	0.00156	ND	0.00159
Cl7-BZ#187 (Congener #187)	52663-68-0	mg/kg	ND	0.00185	ND	0.00188	ND	0.00181	ND	0.00156	ND	0.00159
Cl8-BZ#195 (Congener #195)	52663-78-2	mg/kg	ND	0.00185	ND	0.00188	ND	0.00181	ND	0.00156	ND	0.00159
Cl9-BZ#206 (Congener #206)	40186-72-9	mg/kg	ND	0.00185	ND	0.00188	ND	0.00181	ND	0.00156	ND	0.00159
Cl10-BZ#209 (Congener #209)	2051-24-3	mg/kg	ND	0.00185	ND	0.00188	ND	0.00181	ND	0.00156	ND	0.00159
TOTAL PCBs			ND	--	ND	--	0.05452	--	ND	--	0.0176	--
PCB CALCULATION PER TOGS 5.1.9			ND	--	ND	--	0.10904	--	ND	--	0.0352	--

ANALYTE	HR 116		HR 117		HR 118		HR 119		Comparison Criteria				
SAMPLING DATE	4/18/2010		4/18/2010		4/18/2010		4/18/2010		NOAA SQG		NYSDEC TOGS 5.1.9		
LAB SAMPLE ID	L1005665-04 Composite		L1005665-03 Composite		L1005665-02 Composite		L1005665-01 Composite						
	RESULT	RL	RESULT	RL	RESULT	RL	RESULT	RL	ER-L	ER-M	Class A	Class B	Class C
General Chemistry - Mansfield Lab													
Solids, Total	60.4	0.1	55	--	53	--	56	--	--	--	--	--	--
PCB Congeners (NOAA List) - Mansfield Lab													
Cl2-BZ#8 (Congener #8)	ND	0.00156	ND	0.00167	ND	0.00176	ND	0.00160	--	--	--	--	--
Cl3-BZ#18 (Congener #18)	ND	0.00156	ND	0.00167	ND	0.00176	ND	0.00160	--	--	--	--	--
Cl3-BZ#28 (Congener #28)	ND	0.00156	ND	0.00167	ND	0.00176	0.00337	0.00160	--	--	--	--	--
Cl4-BZ#44 (Congener #44)	ND	0.00156	ND	0.00167	ND	0.00176	ND	0.00160	--	--	--	--	--
Cl4-BZ#49 (Congener #49)	ND	0.00156	ND	0.00167	ND	0.00176	ND	0.00160	--	--	--	--	--
Cl4-BZ#52 (Congener #52)	ND	0.00156	ND	0.00167	ND	0.00176	0.00212	0.00160	--	--	--	--	--
Cl4-BZ#66 (Congener #66)	ND	0.00156	ND	0.00167	ND	0.00176	ND	0.00160	--	--	--	--	--
Cl5-BZ#101 (Congener #101)	ND	0.00156	ND	0.00167	ND	0.00176	ND	0.00160	--	--	--	--	--
Cl5-BZ#105 (Congener #105)	ND	0.00156	ND	0.00167	ND	0.00176	ND	0.00160	--	--	--	--	--
Cl5-BZ#118 (Congener #118)	ND	0.00156	ND	0.00167	ND	0.00176	ND	0.00160	--	--	--	--	--
Cl5-BZ#87 (Congener #87)	ND	0.00156	ND	0.00167	ND	0.00176	ND	0.00160	--	--	--	--	--
Cl6-BZ#128 (Congener #128)	ND	0.00156	ND	0.00167	ND	0.00176	ND	0.00160	--	--	--	--	--
Cl6-BZ#138 (Congener #138)	ND	0.00156	ND	0.00167	ND	0.00176	ND	0.00160	--	--	--	--	--
Cl6-BZ#153 (Congener #153)	ND	0.00156	ND	0.00167	ND	0.00176	ND	0.00160	--	--	--	--	--
Cl7-BZ#170 (Congener #170)	ND	0.00156	ND	0.00167	ND	0.00176	ND	0.00160	--	--	--	--	--
Cl7-BZ#180 (Congener #180)	ND	0.00156	ND	0.00167	ND	0.00176	ND	0.00160	--	--	--	--	--
Cl7-BZ#183 (Congener #183)	ND	0.00156	ND	0.00167	ND	0.00176	ND	0.00160	--	--	--	--	--
Cl7-BZ#184 (Congener #184)	ND	0.00156	ND	0.00167	ND	0.00176	ND	0.00160	--	--	--	--	--
Cl7-BZ#187 (Congener #187)	ND	0.00156	ND	0.00167	ND	0.00176	ND	0.00160	--	--	--	--	--
Cl8-BZ#195 (Congener #195)	ND	0.00156	ND	0.00167	ND	0.00176	ND	0.00160	--	--	--	--	--
Cl9-BZ#206 (Congener #206)	ND	0.00156	ND	0.00167	ND	0.00176	0.003	0.00160	--	--	--	--	--
Cl10-BZ#209 (Congener #209)	ND	0.00156	ND	0.00167	ND	0.00176	0.0141	0.00160	--	--	--	--	--
TOTAL PCBs	ND	--	ND	--	ND	--	0.02259	--	--	--	--	--	--
PCB CALCULATION PER TOGS 5.1.9	ND	--	ND	--	ND	--	0.04518	--	--	--	< 0.1	0.1 - 1	> 1

Classifications:

0.159	Indicates value does not exceed ER-L or TOGS 5.1.9 Class A criteria	0.159	Indicates value does not exceed ER-L or TOGS 5.1.9 Class A criteria
<u>12.4</u>	Indicates value exceeds ER-L value but below ER-M value	52	Indicates value is TOGS 5.1.9 Class B
<u>362</u>	Indicates value exceeds ER-M value	2.08	Indicates value is TOGS 5.1.9 Class C

Underlined or underlined/bolded text in a TOGS 5.1.9 Class A, B, or C coded field indicates corresponding ER-L/ER-M exceedance.

Qualifiers:

ND Laboratory Non-detect Value

-- No criteria given for standard

Criteria:

ER-L / ER-M Adapted From: National Oceanic and Atmospheric Administration. *<u>Sediment Quality Guidelines Developed for the National Status and Trends Program</u>* (June, 1999)

Class A, B, C Adapted From: New York State Department of Environmental Conservation Division of Water. *<u>Technical & Operational Guidance Series (TOGS) 5.1.9 In-water and Riparian Management of Sediment and Dredged Material.</u>* (November, 2004)

TABLE 5
East River and Harlem River
Comparison Criteria Exceedances
Champlain Hudson Power Express

LOCATION			HAR-S120-01		HAR-S120-01		HAR-S121-03		HAR-S122-01		HAR-S123-01		HAR-S124-03	
SAMPLING DATE			5/3/2010		5/3/2010		5/3/2010		5/3/2010		5/3/2010		5/3/2010	
LAB SAMPLE ID			L1006751-01		L1006751-02		L1006751-03		L1006751-04		L1006751-05		L1006751-09	
SAMPLE TYPE/DEPTH			Composite 0-11'		Composite 11-15'		Composite 0-3'		Composite 0-3'		Composite 0-15'		Composite 0-13.5'	
ANALYTE	**CAS #**	**Units**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**
RIM Organochlorine Pesticides - Mansfield Lab														
4,4'-DDD	72-54-8	mg/kg	ND	0.00119	ND	0.00111	0.00571	0.00106	0.00203	0.00124	ND	0.00178	ND	0.00109
4,4'-DDE	72-55-9	mg/kg	ND	0.00119	ND	0.00111	ND	0.00106	ND	0.00124	ND	0.00178	ND	0.00109
4,4'-DDT	50-29-3	mg/kg	ND	0.00119	ND	0.00111	ND	0.00106	ND	0.00124	ND	0.00178	ND	0.00109
TOTAL DDD/E/T		mg/kg	ND	--	ND	--	0.00571	--	0.00203	--	ND	--	ND	--
Dieldrin	60-57-1	mg/kg	ND	0.00119	ND	0.00111	ND	0.00106	ND	0.00124	ND	0.00178	ND	0.00109
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab														
Acenaphthene	83-32-9	mg/kg	ND	0.0119	ND	0.0111	0.0161	0.0106	0.0718	0.0124	ND	0.0178	0.0731	0.0109
Acenaphthylene	208-96-8	mg/kg	ND	0.0119	ND	0.0111	0.337	0.0106	0.065	0.0124	ND	0.0178	ND	0.0109
Anthracene	120-12-7	mg/kg	ND	0.0119	ND	0.0111	0.114	0.0106	0.185	0.0124	ND	0.0178	0.034	0.0109
Benzo(a)anthracene	56-55-3	mg/kg	ND	0.0119	ND	0.0111	0.65	0.0106	0.578	0.0124	ND	0.0178	0.121	0.0109
Benzo(a)pyrene	50-32-8	mg/kg	ND	0.0119	ND	0.0111	0.823	0.0106	0.43	0.0124	ND	0.0178	0.0651	0.0109
Chrysene	218-01-9	mg/kg	ND	0.0119	ND	0.0111	1.11	0.0106	0.514	0.0124	ND	0.0178	0.103	0.0109
Dibenz(a,h)anthracene	53-70-3	mg/kg	ND	0.0119	ND	0.0111	0.203	0.0106	0.159	0.0124	ND	0.0178	0.0284	0.0109
Fluoranthene	206-44-0	mg/kg	ND	0.0119	ND	0.0111	2.68	0.0106	**1.22**	0.0124	ND	0.0178	0.69	0.0109
Fluorene	86-73-7	mg/kg	ND	0.0119	ND	0.0111	0.121	0.0106	0.0877	0.0124	ND	0.0178	ND	0.0109
Naphthalene	91-20-3	mg/kg	ND	0.0119	ND	0.0111	0.297	0.0106	0.195	0.0124	ND	0.0178	0.0327	0.0109
Phenanthrene	85-01-8	mg/kg	ND	0.0119	ND	0.0111	**2.57**	0.0106	0.722	0.0124	ND	0.0178	0.0382	0.0109
Pyrene	129-00-0	mg/kg	ND	0.0119	ND	0.0111	1.72	0.0106	0.982	0.0124	ND	0.0178	0.69	0.0109
TOTAL PAH		mg/kg	ND	--	ND	--	13.885	--	7.290	--	ND	--	2.478	--
TOTAL PCBs		mg/kg	ND	--	ND	--	0.0061	--	0.01202	--	ND	--	ND	--
PCB CALCULATION PER TOGS 5.1.9		mg/kg	ND	--	ND	--	0.0122	--	0.02404	--	ND	--	ND	--
Dioxin - Method 1613														
I-TEF-1988 TEQ (ND=0)	--	mg/kg	0.00E+00	--	0.00E+00	--	NA		1.12E-06	--	NA		9.80E-07	--
I-TEF-1988 TEQ (ND=1/2)	--	mg/kg	5.01E-06	--	5.01E-06	--	NA		5.77E-06	--	NA		5.88E-06	--
Total Metals - Mansfield Lab														
Arsenic, Total	7440-38-2	mg/kg	0.603	0.039	1.08	0.036	1.8	0.038	3.68	0.04	9.99	0.061	0.918	0.034
Cadmium, Total	7440-43-9	mg/kg	ND	0.039	0.067	0.036	ND	0.038	0.151	0.04	0.213	0.061	0.064	0.034
Copper, Total	7440-50-8	mg/kg	5.47	0.387	14.4	0.364	7.47	0.375	14.7	0.404	14.8	0.61	12.1	0.343
Lead, Total	7439-92-1	mg/kg	1.97	0.039	3.33	0.036	20.7	0.038	26.3	0.04	8.69	0.061	12.9	0.034
Mercury, Total	7439-97-6	mg/kg	ND	0.014	ND	0.012	0.035	0.013	0.155	0.016	ND	0.023	0.023	0.013
Nickel, Total	7440-02-0	mg/kg	6.62	0.077	15.2	0.073	4.46	0.075	5.38	0.081	23.8	0.122	8.9	0.069
Zinc, Total	7440-66-6	mg/kg	16.7	0.774	38.2	0.728	26.4	0.75	39.4	0.807	81	1.22	39.5	0.687

LOCATION	HAR-S125-03		EAS-S127-02		EAS-S127-02		EAS-S128-02		EAS-S129-01		Comparison Criteria				
SAMPLING DATE	5/3/2010		5/7/2010		5/7/2010		5/5/2010		5/5/2010		NOAA SQG		NYSDEC TOGS 5.1.9		
LAB SAMPLE ID	L1006751-08		L1006751-16		L1006751-17		L1006751-15		L1006751-14						
SAMPLE TYPE/DEPTH	Composite 0-11.8'		Composite 0-10.5'		Composite 10.5-15.5'		Composite 0-14.5'		Composite 0-15'						
ANALYTE	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**ER-L**	**ER-M**	**Class A**	**Class B**	**Class C**
RIM Organochlorine Pesticides - Mansfield Lab															
4,4'-DDD	**0.063**	0.00177	ND	0.00116	ND	0.00191	ND	0.00142	ND	0.0018	0.002	0.02	--	--	--
4,4'-DDE	**0.0594**	0.00177	ND	0.00116	ND	0.00191	ND	0.00142	ND	0.0018	0.002	0.015	--	--	--
4,4'-DDT	**0.0203**	0.00177	ND	0.00116	ND	0.00191	ND	0.00142	ND	0.0018	0.001	0.007	--	--	--
TOTAL DDD/E/T	**0.14270**	--	ND	--	ND	--	ND	--	ND	--	0.00158	0.0461	< 0.003	0.003 - 0.03	> 0.03
Dieldrin	**0.0225**	0.00177	ND	0.00116	ND	0.00191	ND	0.00142	ND	0.0018	0.00002	0.008	< 0.11	0.11 - 0.48	> 0.48
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab															
Acenaphthene	**48.4**	0.707	0.148	0.0116	ND	0.0191	0.175	0.0142	ND	0.018	0.016	0.5	--	--	--
Acenaphthylene	**5.77**	0.707	0.227	0.0116	ND	0.0191	0.581	0.0142	0.0385	0.018	0.044	0.64	--	--	--
Anthracene	**42.4**	0.707	0.45	0.0116	ND	0.0191	0.946	0.0142	0.0199	0.018	0.0853	1.1	--	--	--
Benzo(a)anthracene	**18.7**	0.707	1.21	0.0116	ND	0.0191	**2.47**	0.0142	0.0682	0.018	0.261	1.6	--	--	--
Benzo(a)pyrene	**14.7**	0.707	0.983	0.0116	ND	0.0191	**1.97**	0.0142	0.0676	0.018	0.43	1.6	--	--	--
Chrysene	**19.7**	0.707	0.946	0.0116	ND	0.0191	1.92	0.0142	0.0542	0.018	0.384	2.8	--	--	--
Dibenz(a,h)anthracene	1.74	0.707	0.16	0.0116	ND	0.0191	**0.268**	0.0142	ND	0.018	0.0634	0.26	--	--	--
Fluoranthene	**37.1**	0.707	1.61	0.0116	ND	0.0191	2.88	0.0142	0.0895	0.018	0.6	5.1	--	--	--
Fluorene	**22**	0.707	0.0978	0.0116	ND	0.0191	0.129	0.0142	ND	0.018	0.019	0.54	--	--	--
Naphthalene	**232**	0.707	0.347	0.0116	ND	0.0191	0.13	0.0142	ND	0.018	0.16	2.1	--	--	--
Phenanthrene	**76.3**	0.707	0.434	0.0116	ND	0.0191	0.445	0.0142	0.0182	0.018	0.24	1.5	--	--	--
Pyrene	**47.2**	0.707	1.94	0.0116	ND	0.0191	**3.87**	0.0142	0.34	0.018	0.665	2.6	--	--	--
TOTAL PAH	**614.360**	--	10.679	--	ND	--	19.352	--	0.839	--	4.022	44.792	< 4	4 - 35	> 35
TOTAL PCBs	0.80	--	ND	--	ND	--	ND	--	ND	--	--	--	--	--	--
PCB CALCULATION PER TOGS 5.1.9	1.5962	--	ND	--	ND	--	ND	--	ND	--	--	--	< 0.1	0.1 - 1	> 1
Dioxin - Method 1613															
I-TEF-1988 TEQ (ND=0)	NA		4.77E-08	--	2.26E-07	--	7.72E-07	--	8.64E-07	--	--	--	< 4.50E-06	4.50E-06 to 5.00E-05	> 5.00E-05
I-TEF-1988 TEQ (ND=1/2)	NA		5.05E-06	--	5.21E-06	--	5.70E-06	--	5.84E-06	--	--	--	< 4.50E-06	4.50E-06 to 5.00E-05	> 5.00E-05
Total Metals - Mansfield Lab															
Arsenic, Total	15.4	0.066	2.68	0.035	7.5	0.065	10.6	0.046	9.91	0.063	8.2	70	< 14	14 - 53	> 53
Cadmium, Total	5.37	0.066	ND	0.035	0.17	0.065	0.208	0.046	0.149	0.063	1.2	9.6	< 1.2	1.2 - 9.5	> 9.5
Copper, Total	251	0.66	2.36	0.354	15.5	0.65	20.7	0.462	13.6	0.625	34	270	< 33	33 - 207	> 207
Lead, Total	**336**	0.066	2.16	0.035	9.58	0.065	22.5	0.046	9.79	0.063	43.7	218	< 33	33 - 166	> 166
Mercury, Total	**3.11**	0.021	ND	0.013	ND	0.024	0.319	0.017	ND	0.022	0.15	0.71	< 0.17	0.17 - 1.6	> 1.6
Nickel, Total	43.4	0.132	7.36	0.071	25.5	0.13	18.1	0.093	24	0.125	20.9	51.6	--	--	--
Zinc, Total	**551**	1.32	22.1	0.708	87.4	1.3	76.1	0.925	79.5	1.25	150	410	--	--	--

Classifications:

0.159	Indicates value does not exceed ER-L or TOGS 5.1.9 Class A criteria	0.159	Indicates value does not exceed ER-L or TOGS 5.1.9 Class A criteria
12.4	Indicates value exceeds ER-L value but below ER-M value	52	Indicates value is TOGS 5.1.9 Class B
362	Indicates value exceeds ER-M value	2.08	Indicates value is TOGS 5.1.9 Class C

Underlined or underlined/bolded text in a TOGS 5.1.9 Class A, B, or C coded field indicates corresponding ER-L/ER-M exceedance.

RL - Reporting Limit

Qualifiers:

ND Laboratory Non-detect Value

-- No criteria given for standard

NA Constituent not analyzed for.

DPE Indicates the presence of a peak in the polychlorinated diphenylether channel that could cause a false positive or an overestimation of the affected analyte(s).

Q Indicates the presence of a quantitative interference. This situation may result in an underestimation of the affected analyte(s).

** For HAR-S122, HAR-S124, and EAS-S128, dioxin 2,3,7,8-TCDF was analyzed with the 17 dioxins and on it's own in a confirmation analysis. The greater of the two values is reported on this table. See Appendix B Parts II & III for complete lab data.

Criteria:

ER-L / ER-M Adapted From: National Oceanic and Atmospheric Administration. *Sediment Quality Guidelines Developed for the National Status and Trends Program* (June, 1999)

Class A, B, C Adapted From: New York State Department of Environmental Conservation Division of Water. *Technical & Operational Guidance Series (TOGS) 5.1.9 In-water and Riparian Management of Sediment and Dredged Material.* (November, 2004)

Table 6- List of the Most Abundant Taxa Collected in Lake Champlain Benthic Samples

Taxa	Estimated Total Number of Individuals collected	Percentage of Total Number of Individuals Collected
Dreissena polymorpha	1,543	18%
Tanytarsus sp.	983	12%
Pisidium sp.	640	8%
Gammarus sp.	447	5%
Limnodrilus hoffmeisteri	418	5%
Paratendipes albimanus	349	4%
Chironomus sp.	325	4%
Hexagenia limbata	280	3%
Chaoborus sp.	269	3%
Hydrobiidae	259	3%
Procladius sp.	251	3%
Manayunkia speciosa	214	3%
Undet. Tubificidae w/o cap. setae	189	2%
Stylodrilus heringianus	142	2%
Cryptochironomus sp.	135	2%
All Other Taxa	2,026	24%
Grand Total	**8,470**	**100%**

Table 7- List of the Most Abundant Taxa Collected in Champlain Canal Benthic Samples

Taxa	Estimated Total Number of Individuals collected	Percentage of Total Number of Individuals Collected
Dreissena polymorpha	341	16%
Pisidium sp.	322	15%
Limnodrilus hoffmeisteri	220	10%
Chaoborus sp.	166	8%
Procladius sp.	157	7%
Tribelos sp.	130	6%
Hexagenia limbata	107	5%
Chironomus sp.	102	5%
Coelotanypus sp.	84	4%
Gammarus sp.	77	4%
Undet. Tubificidae w/o cap. setae	57	3%
Probezzia sp.	45	2%
Tanytarsus sp.	34	2%
Phylocentropus sp.	34	2%
All Other Taxa	317	14%
Grand Total	**2,193**	**100%**

Table 8 - List of the Taxa Collected in Harlem River Benthic Samples

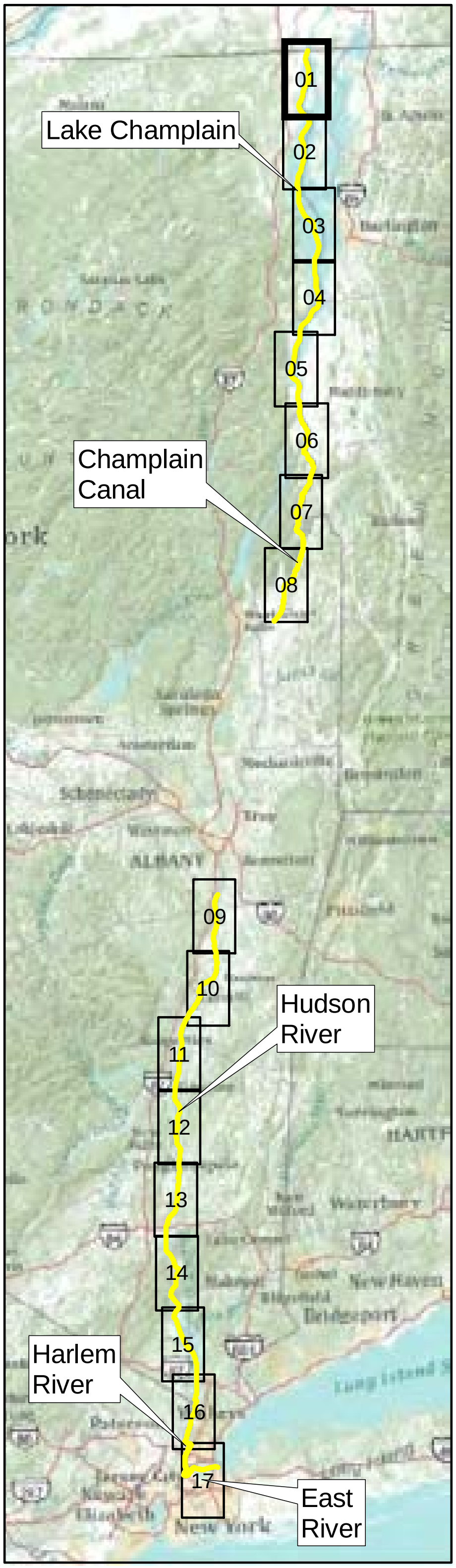
Taxa	Estimated Total Number of Individuals collected per 1 m^2	Percentage of Total Number of Individuals Collected
Streblospio benedicti	29,263	64%
Scolecolepides viridis	3,520	8%
Polydora ligni	2,250	5%
Oligochaeta	2,100	5%
Sabellaria vulgaris	1,950	4%
Aoridae	1,810	4%
Cyathura polita	1,500	3%
Capitellidae	1,270	3%
Phyllodocidae	600	1%
Cirratulidae	450	1%
Unciola irrorata	450	1%
Actiniaria	150	0%
Molgula manhattensis	150	0%
Nematoda	150	0%
Nereis sp.	150	0%
Chiridotea sp.	10	0%
Corophium sp.	10	0%
Grand Total	**45,785**	**100%**

Table 9 - List of the Most Abundant Taxa Collected in East River Benthic Samples

Taxa	Estimated Total Number of Individuals collected per 1 m^2	Percentage of Total Number of Individuals Collected
Cirratulidae	26551	49%
Sabellaria vulgaris	8550	16%
Leitoscoloplos fragilis	4487	8%
Aoridae	4188	8%
Oligochaeta	2704	5%
Phoxocephalidae	1275	2%
Nereis sp.	1138	2%
Streblospio benedicti	994	2%
Phyllodocidae	846	2%
Corophium sp.	706	1%
Ampelisca abdita	643	1%
Polynoidae	425	1%
Capitellidae	415	1%
All other taxa	1640	3%
Grand Total	**54562**	**100%**

APPENDIX A

Marine Route Survey Sediment Core and Benthic Sample Locations



Benthic Grab Sample

Sediment Core Samples

Physical Sample

Physical/Chemical Sample

Physical/Chemical Sample with Dioxin

Physical and PCB only Sample

Proposed Underwater Cable Route

Transmission Developers Inc.

HDR

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

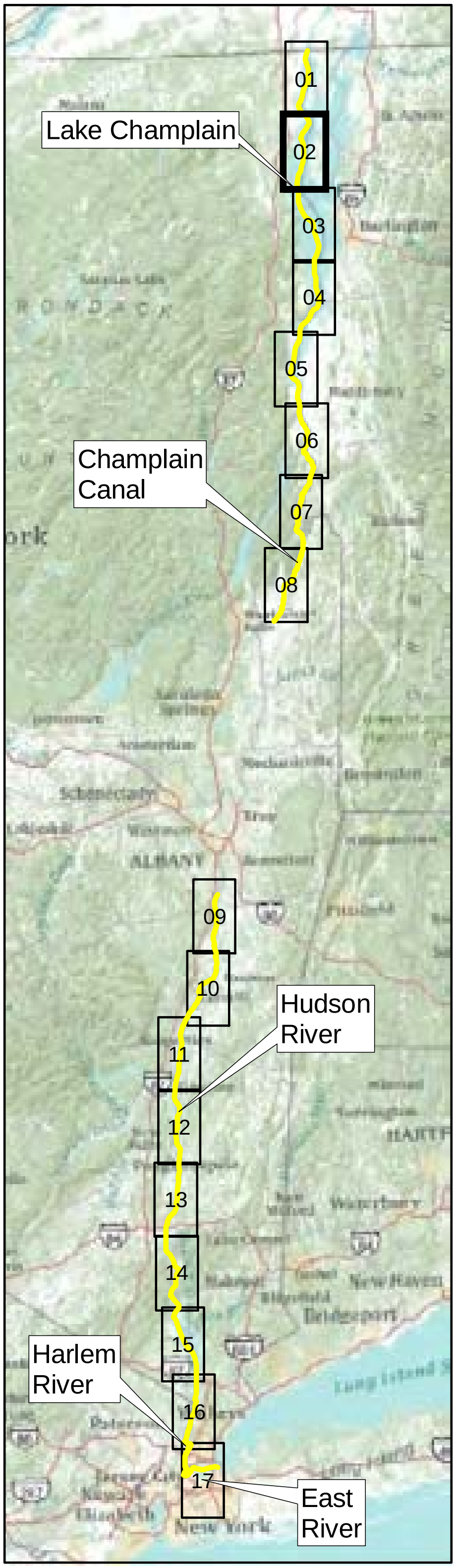
Sediment Core and Benthic Grab Locations

SOURCES: ESRI, NAIP, TDI, TRC, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYDEC)

0 1 2 Miles

0 5,000 10,000 Feet

Sheet 01 of 17



Benthic Grab Sample

Sediment Core Samples

- Physical Sample
- Physical/Chemical Sample
- Physical/Chemical Sample with Dioxin
- Physical and PCB only Sample
- Proposed Underwater Cable Route

Transmission Developers Inc.

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Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

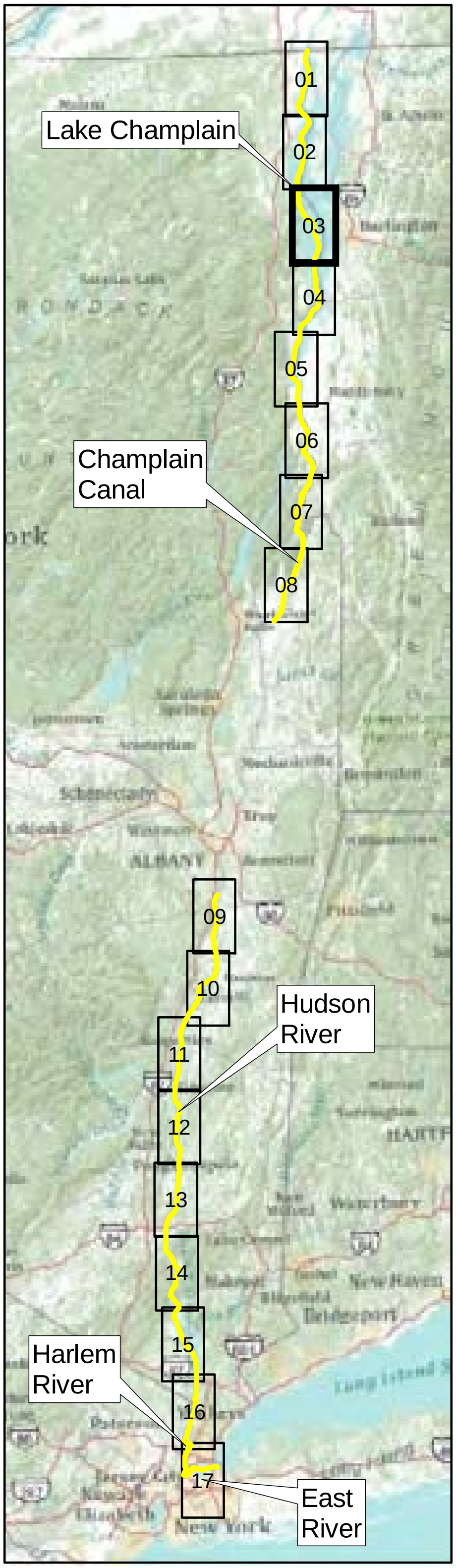
Sediment Core and Benthic Grab Locations

SOURCES: ESRI, NAIP, TDI, TRC, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYDEC)

0 1 2 Miles

0 5,000 10,000 Feet

Sheet 02 of 17



- Benthic Grab Sample

Sediment Core Samples

- Physical Sample
- Physical/Chemical Sample
- Physical/Chemical Sample with Dioxin
- Physical and PCB only Sample
- Proposed Underwater Cable Route

Transmission Developers Inc.

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Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

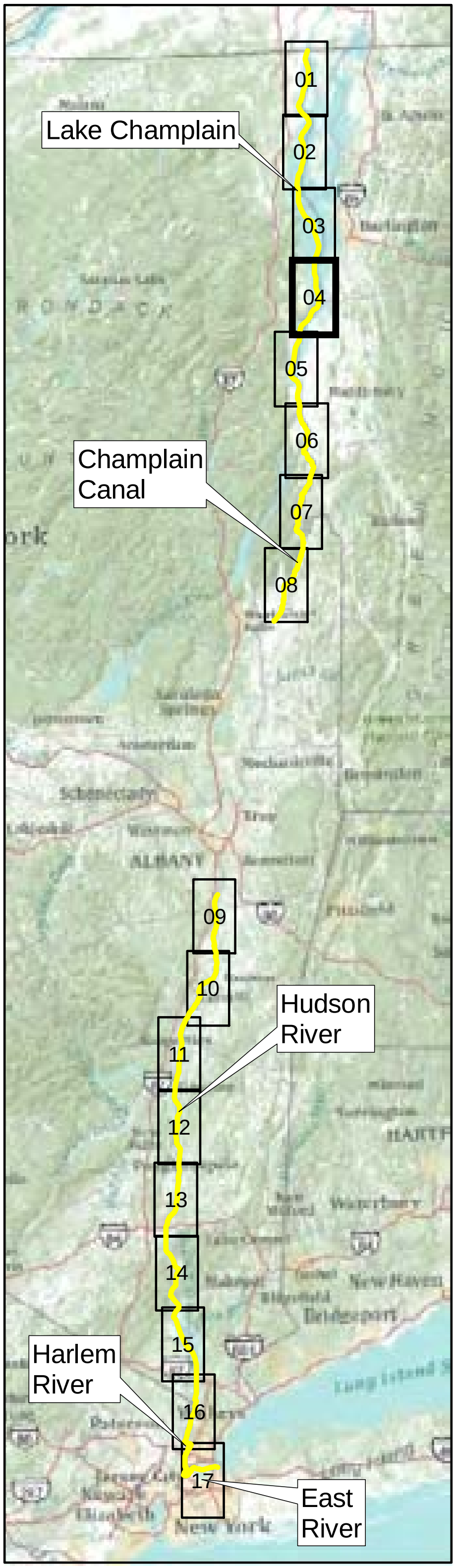
Sediment Core and Benthic Grab Locations

SOURCES: ESRI, NAIP, TDI, TRC, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYDEC)

0 1 2 Miles

0 5,000 10,000 Feet

Sheet 03 of 17



Benthic Grab Sample

Sediment Core Samples

- Physical Sample
- Physical/Chemical Sample
- Physical/Chemical Sample with Dioxin
- Physical and PCB only Sample
- Proposed Underwater Cable Route

Transmission Developers Inc.

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Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

Sediment Core and Benthic Grab Locations

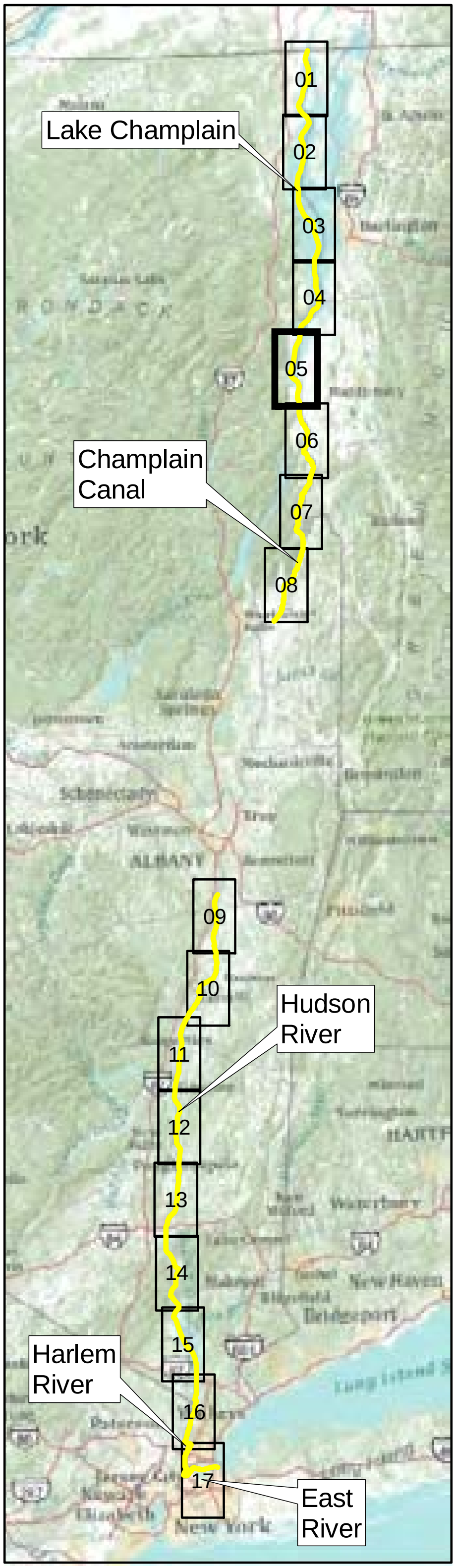
SOURCES: ESRI, NAIP, TDI, TRC, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYDEC)

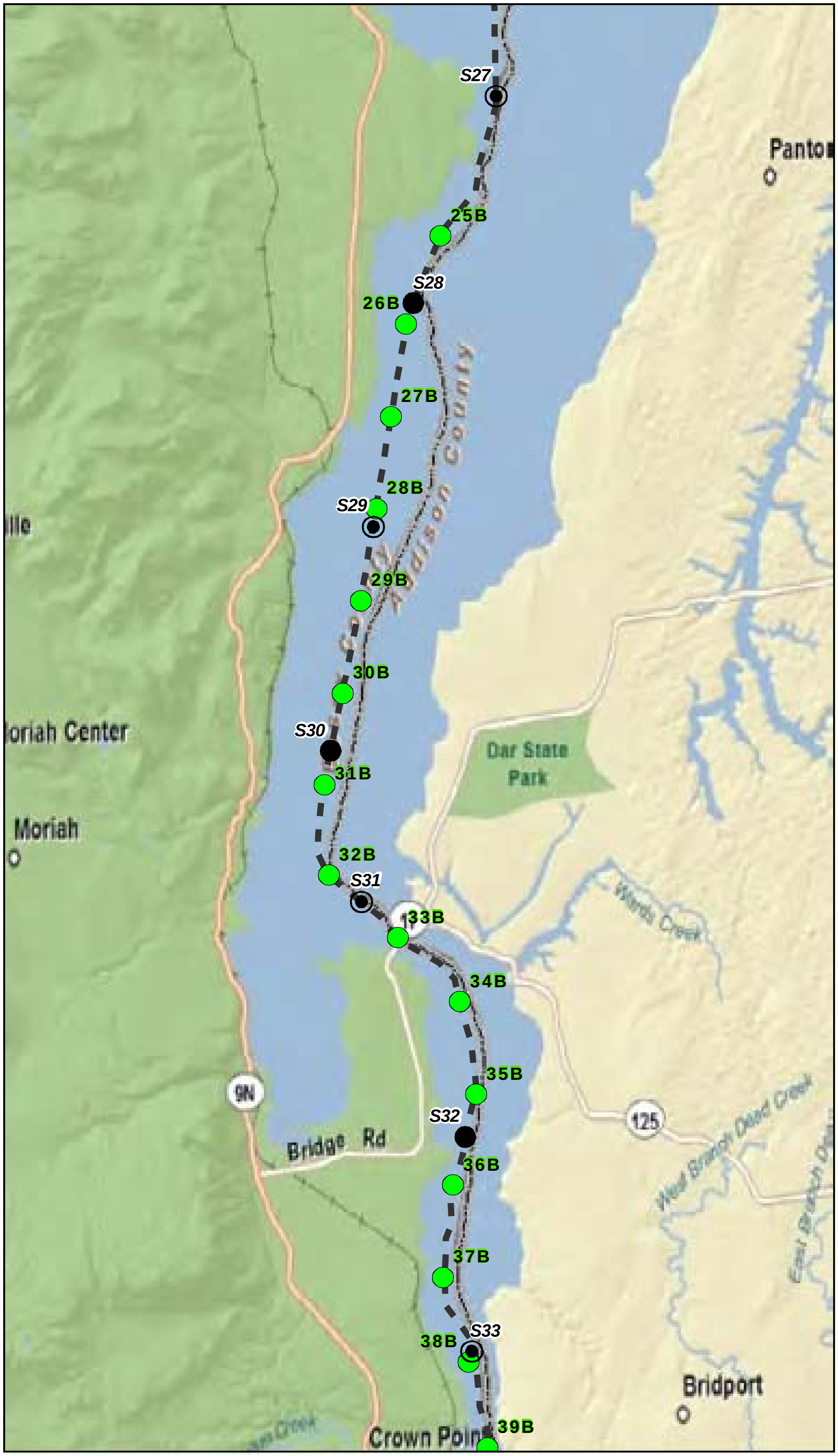
0 1 2 Miles

0 5,000 10,000 Feet

N

Sheet 04 of 17





Benthic Grab Sample

Sediment Core Samples

Physical Sample

Physical/Chemical Sample

Physical/Chemical Sample with Dioxin

Physical and PCB only Sample

Proposed Underwater Cable Route

Transmission Developers Inc.

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Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

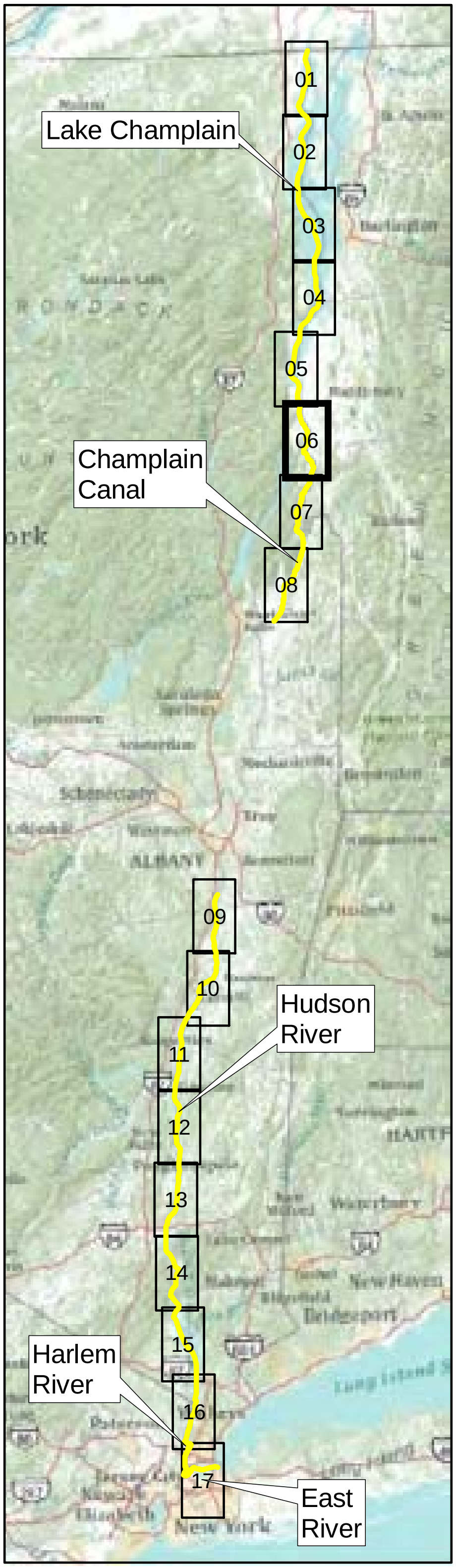
Sediment Core and Benthic Grab Locations

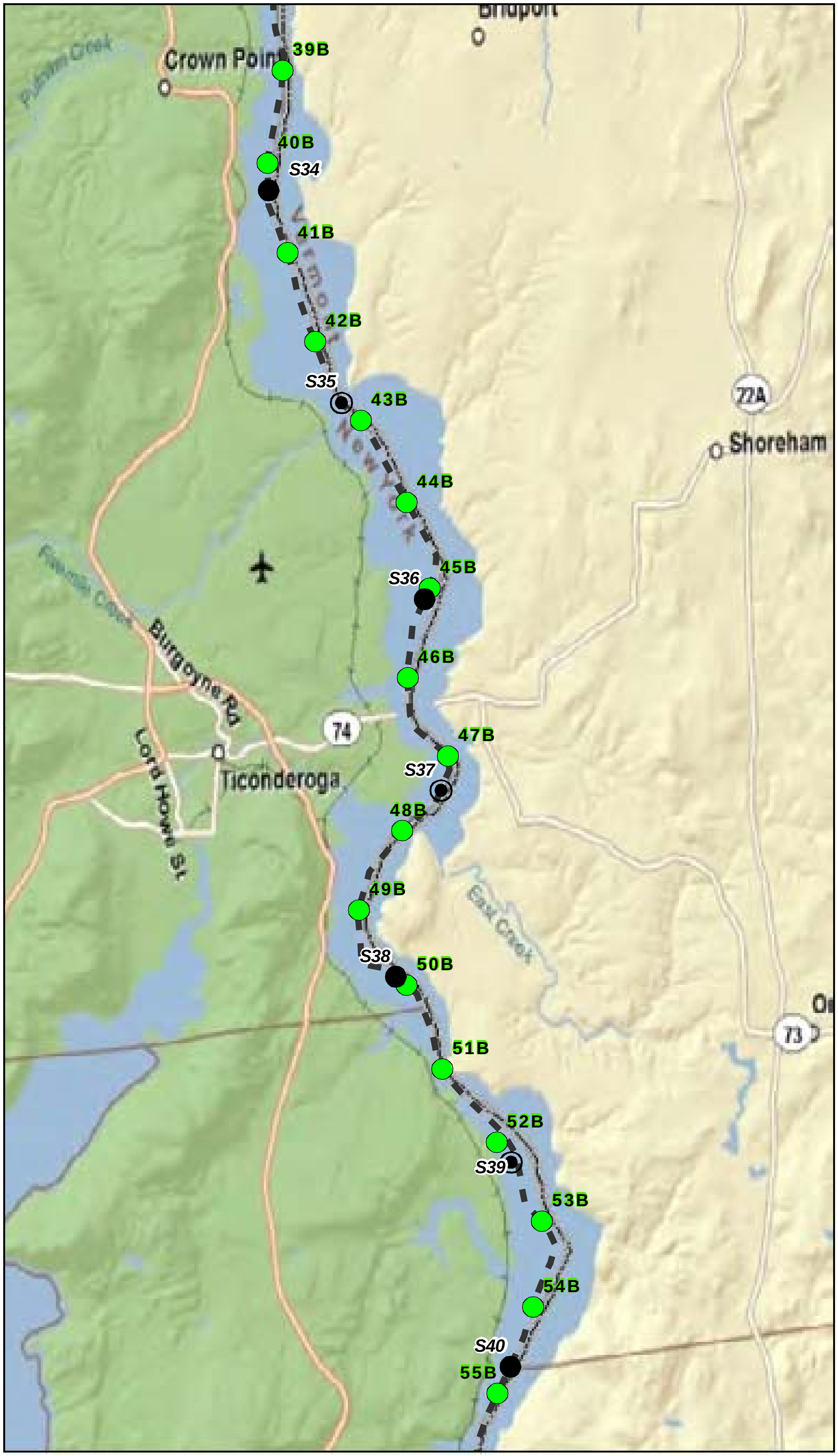
SOURCES: ESRI, NAIP, TDI, TRC, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYDEC)

0 1 2 Miles

0 5,000 10,000 Feet

Sheet 05 of 17





- Benthic Grab Sample

Sediment Core Samples

- Physical Sample
- Physical/Chemical Sample
- Physical/Chemical Sample with Dioxin
- Physical and PCB only Sample
- Proposed Underwater Cable Route

Transmission Developers Inc.

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Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

Sediment Core and Benthic Grab Locations

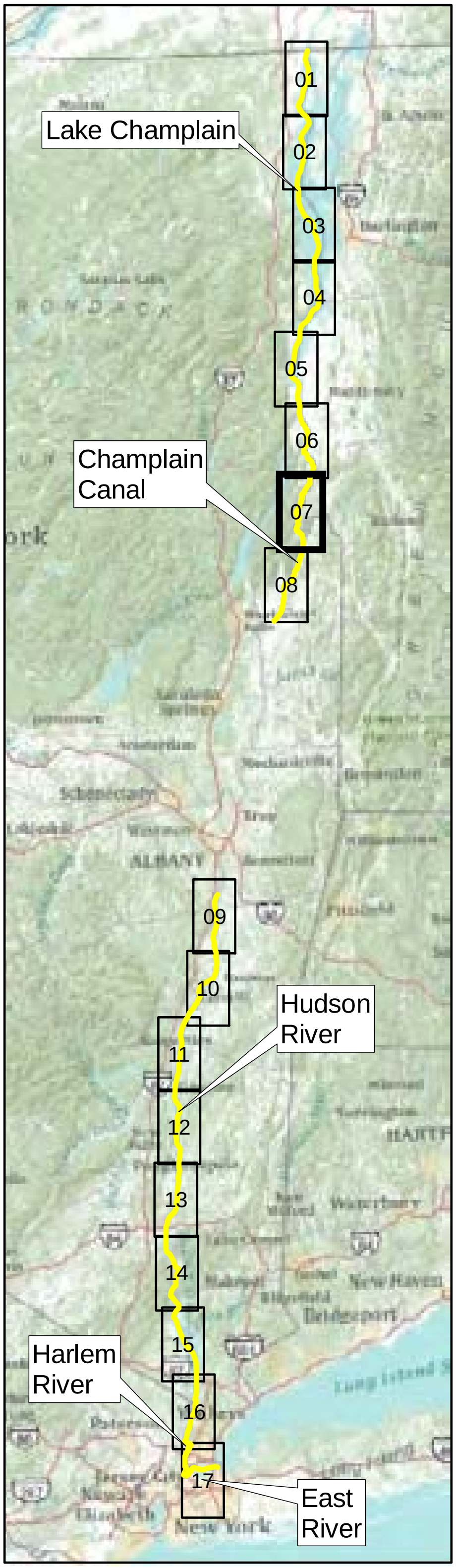
SOURCES: ESRI, NAIP, TDI, TRC, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYDEC)

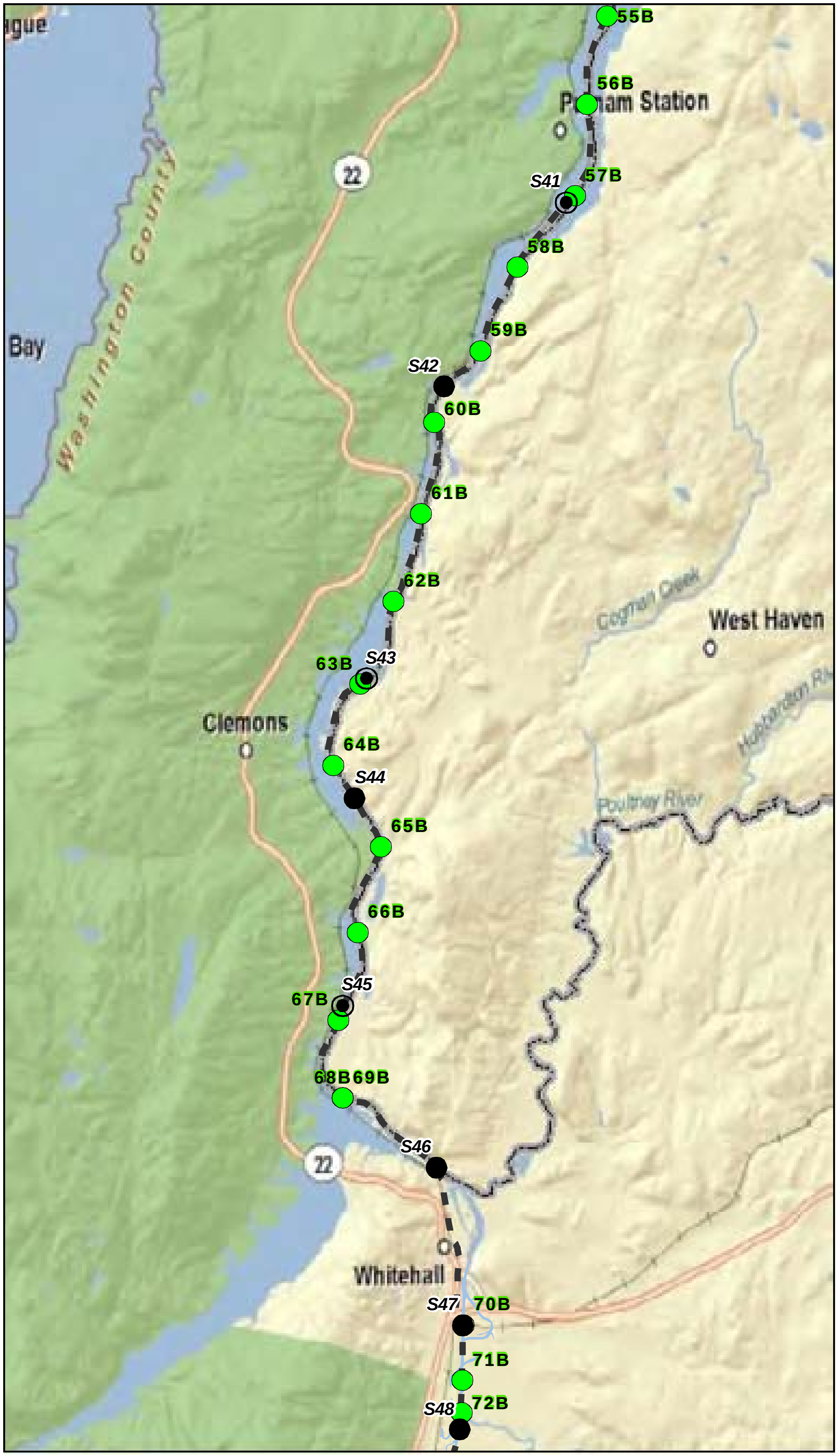
0 1 2 Miles

0 5,000 10,000 Feet

N

Sheet 06 of 17





Benthic Grab Sample

Sediment Core Samples

- Physical Sample
- Physical/Chemical Sample
- Physical/Chemical Sample with Dioxin
- Physical and PCB only Sample

Proposed Underwater Cable Route

Transmission Developers Inc.

HDR

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

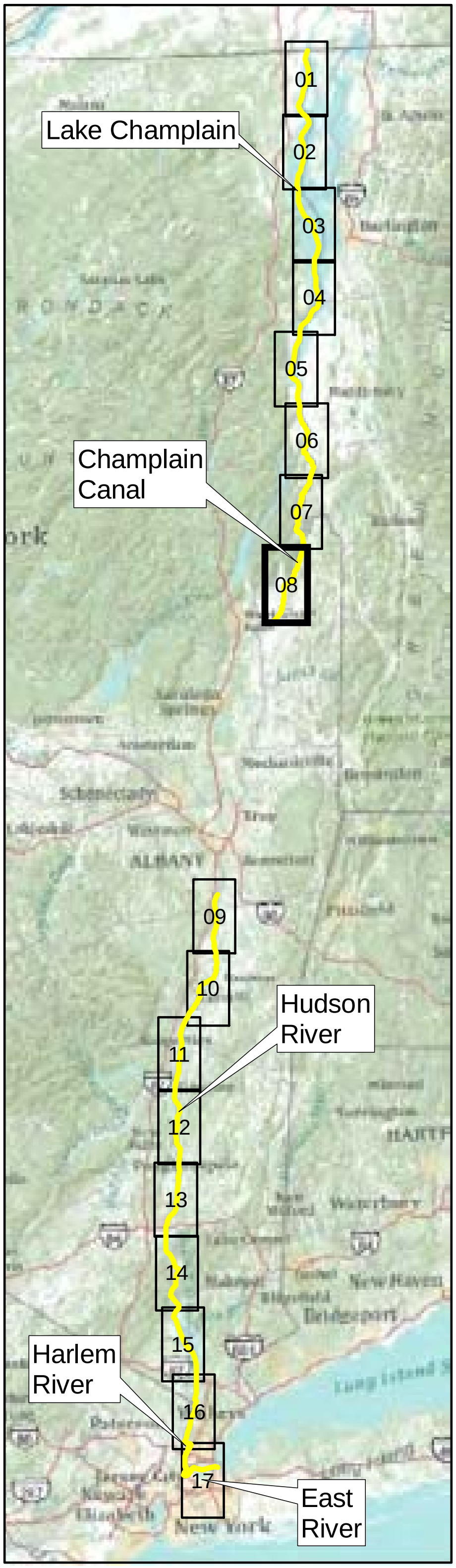
Sediment Core and Benthic Grab Locations

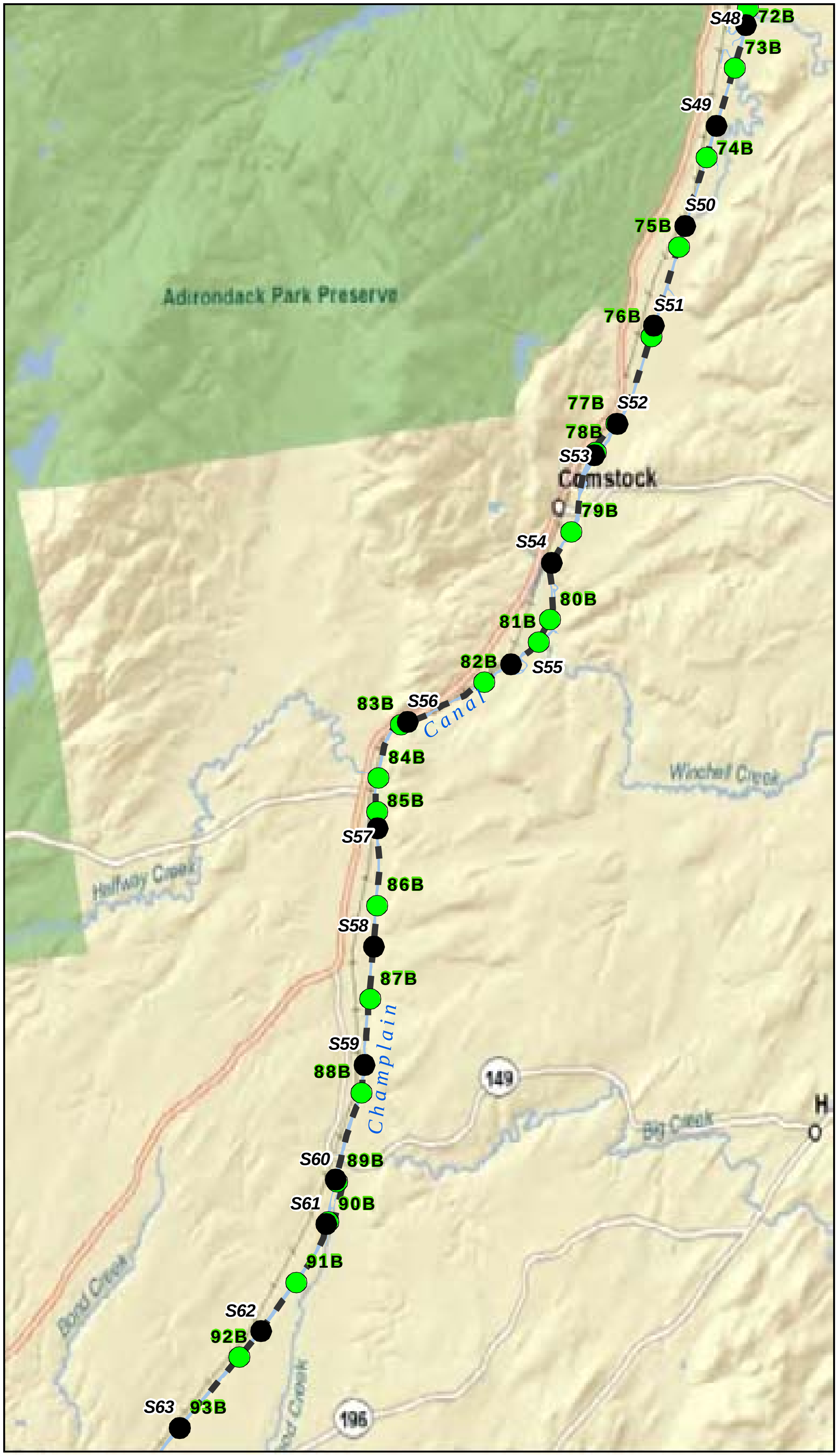
SOURCES: ESRI, NAIP, TDI, TRC, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYDEC)

0 1 2 Miles

0 5,000 10,000 Feet

Sheet 07 of 17





Benthic Grab Sample

Sediment Core Samples

Physical Sample

Physical/Chemical Sample

Physical/Chemical Sample with Dioxin

Physical and PCB only Sample

Proposed Underwater Cable Route

Champlain Hudson Power Express Project

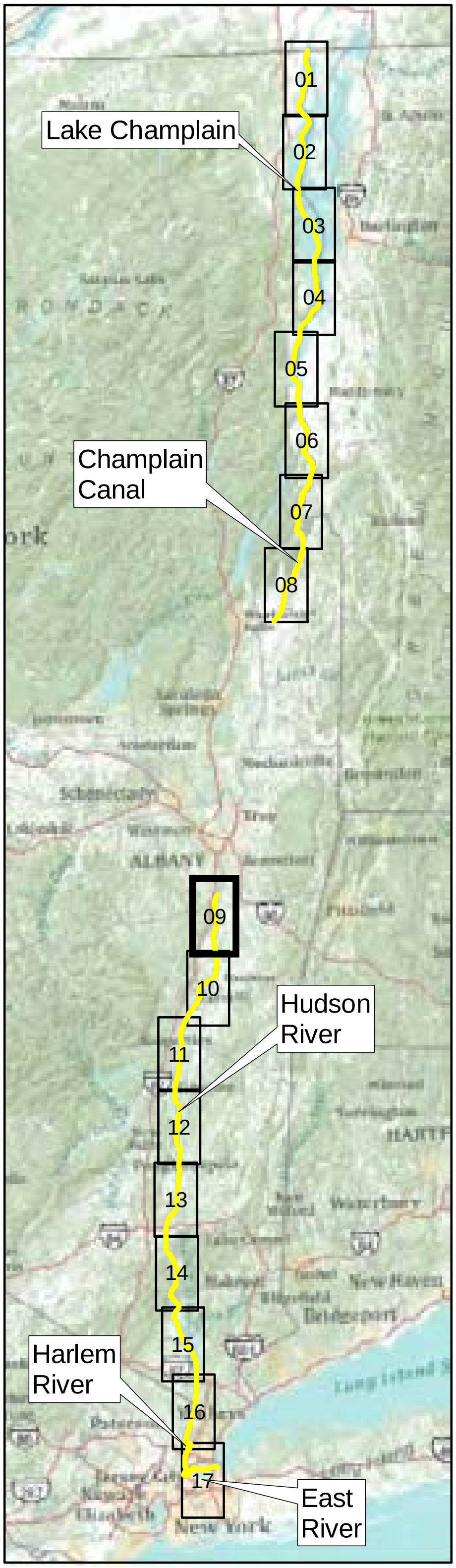
Champlain Hudson Power Express Inc.

Sediment Core and Benthic Grab Locations

SOURCES: ESRI, NAIP, TDI, TRC, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYDEC)

0 1 2 Miles

0 5,000 10,000 Feet



- Benthic Grab Sample

Sediment Core Samples

- Physical Sample
- Physical/Chemical Sample
- Physical/Chemical Sample with Dioxin
- Physical and PCB only Sample
- Proposed Underwater Cable Route

Transmission Developers Inc.

HDR

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

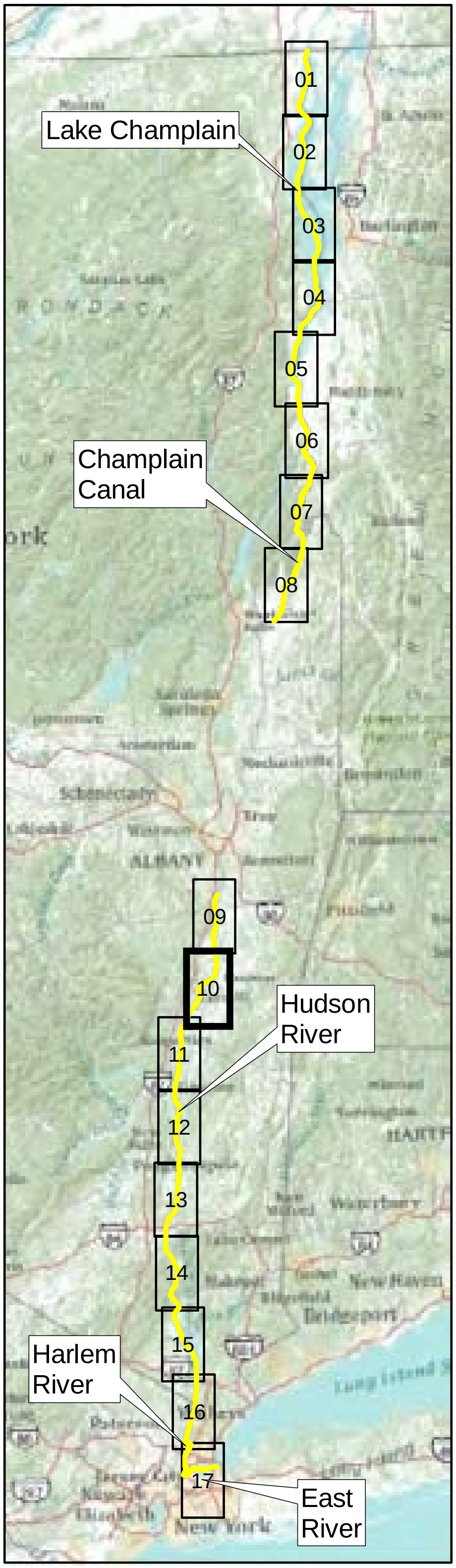
Sediment Core and Benthic Grab Locations

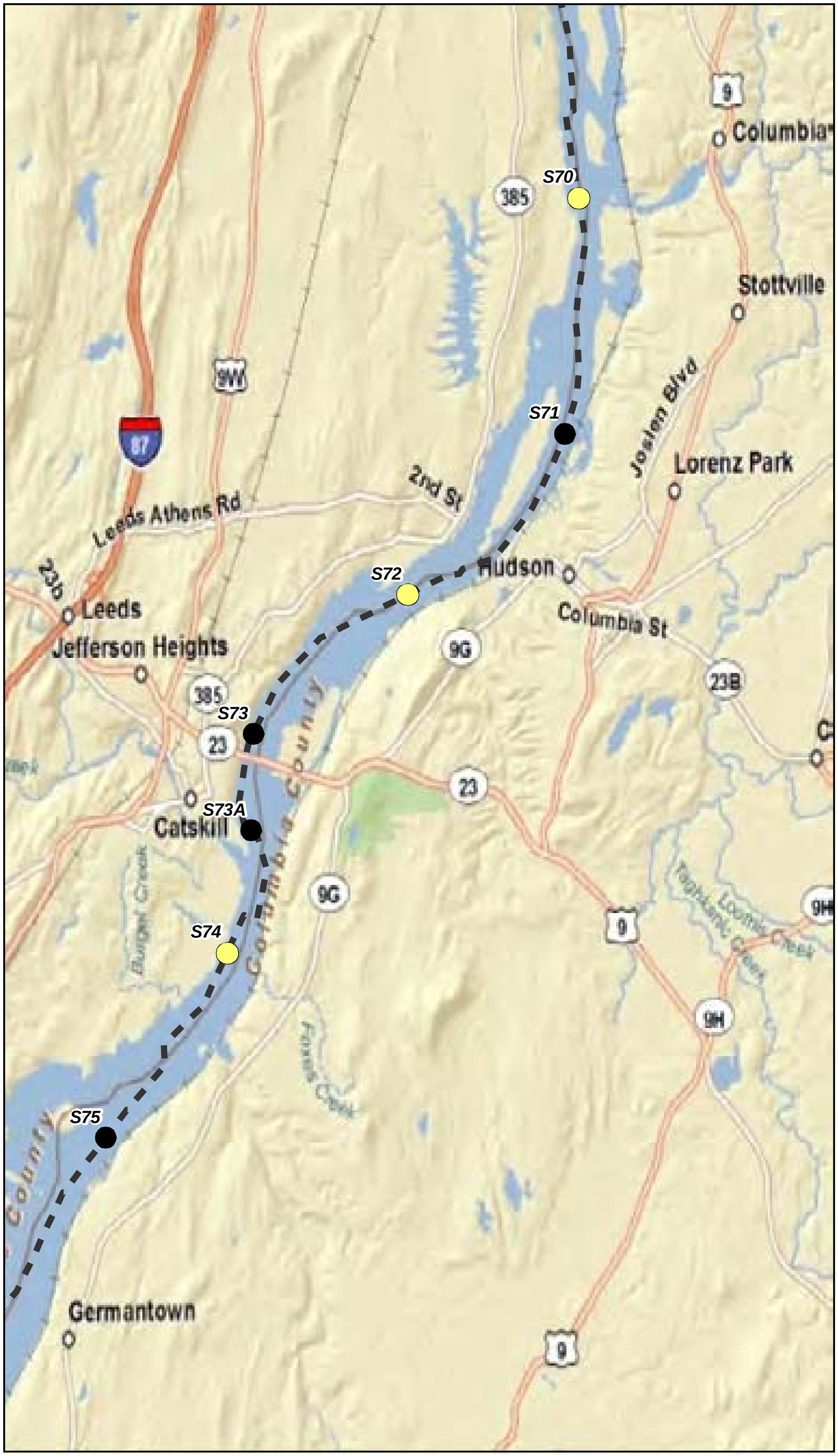
SOURCES: ESRI, NAIP, TDI, TRC, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYDEC)

0 1 2 Miles

0 5,000 10,000 Feet

Sheet 09 of 17





Benthic Grab Sample

Sediment Core Samples

- Physical Sample
- Physical/Chemical Sample
- Physical/Chemical Sample with Dioxin
- Physical and PCB only Sample
- Proposed Underwater Cable Route

Transmission Developers Inc.

HDR

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

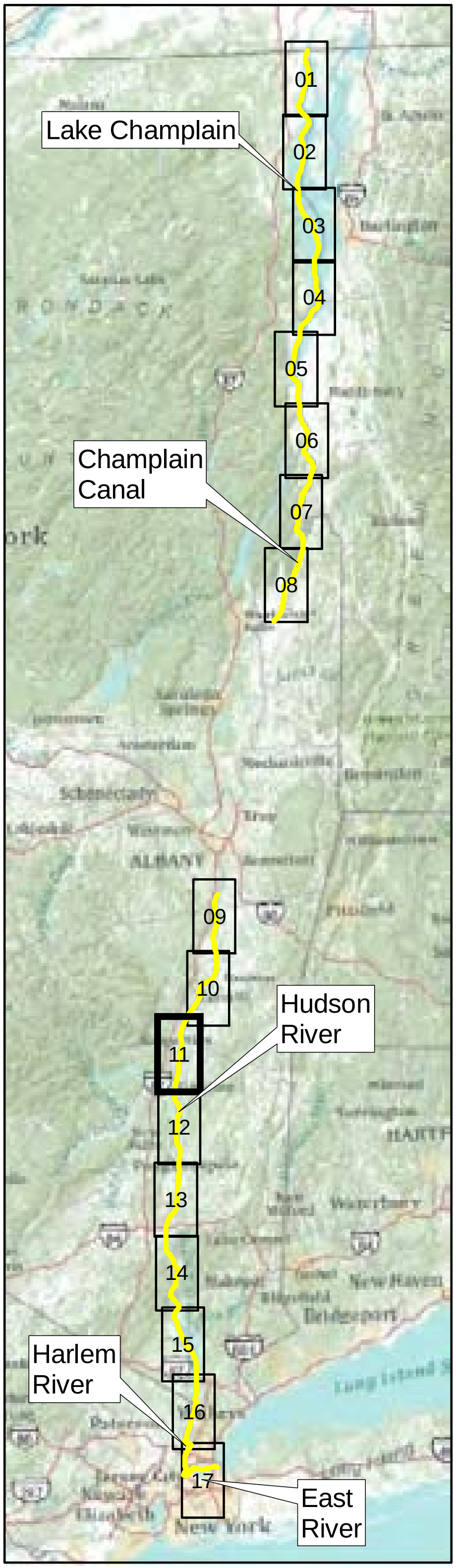
Sediment Core and Benthic Grab Locations

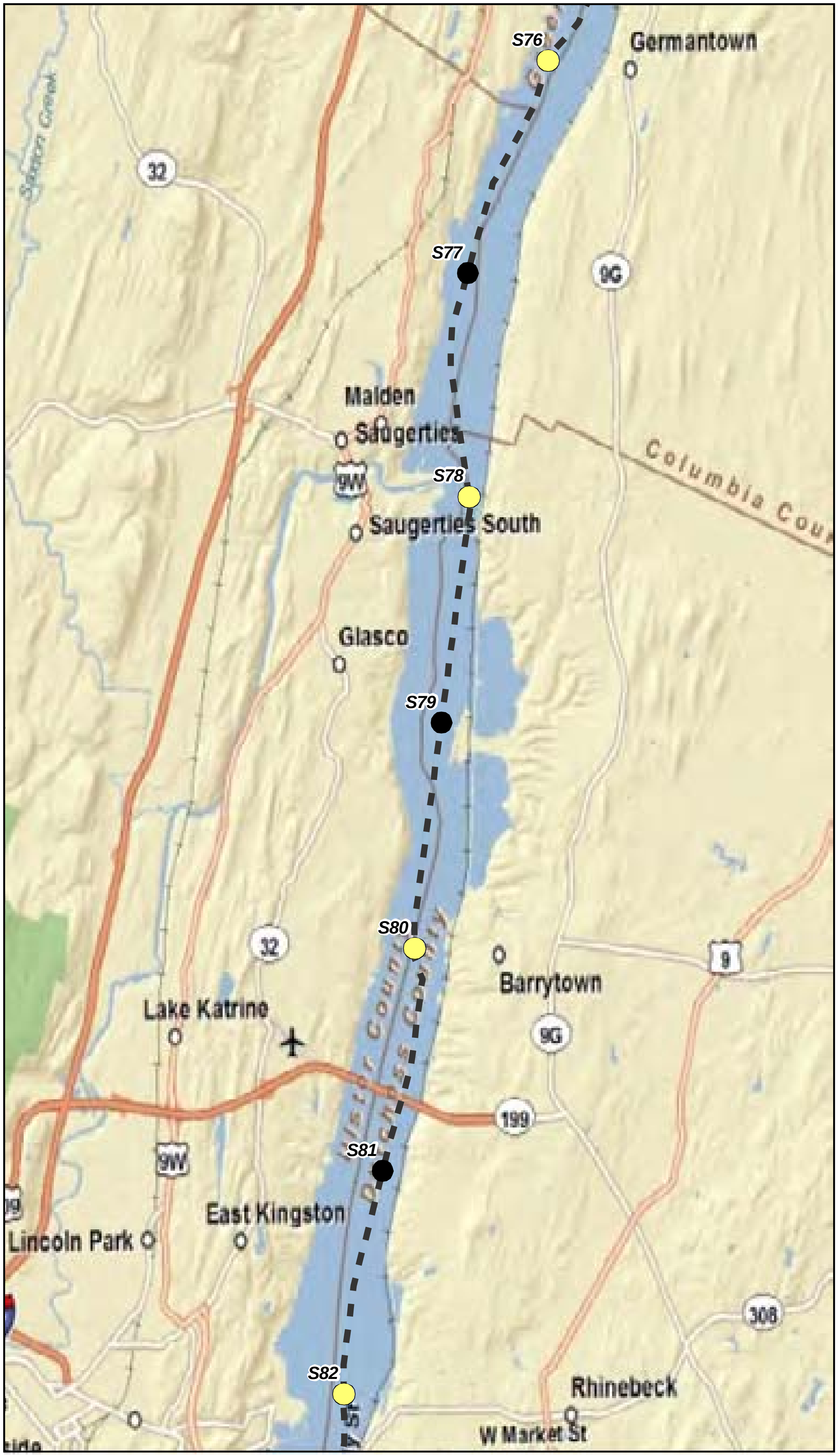
SOURCES: ESRI, NAIP, TDI, TRC, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYDEC)

0 1 2 Miles

0 5,000 10,000 Feet

Sheet 10 of 17





Benthic Grab Sample

Sediment Core Samples

Physical Sample

Physical/Chemical Sample

Physical/Chemical Sample with Dioxin

Physical and PCB only Sample

Proposed Underwater Cable Route

Transmission Developers Inc.

HDR

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

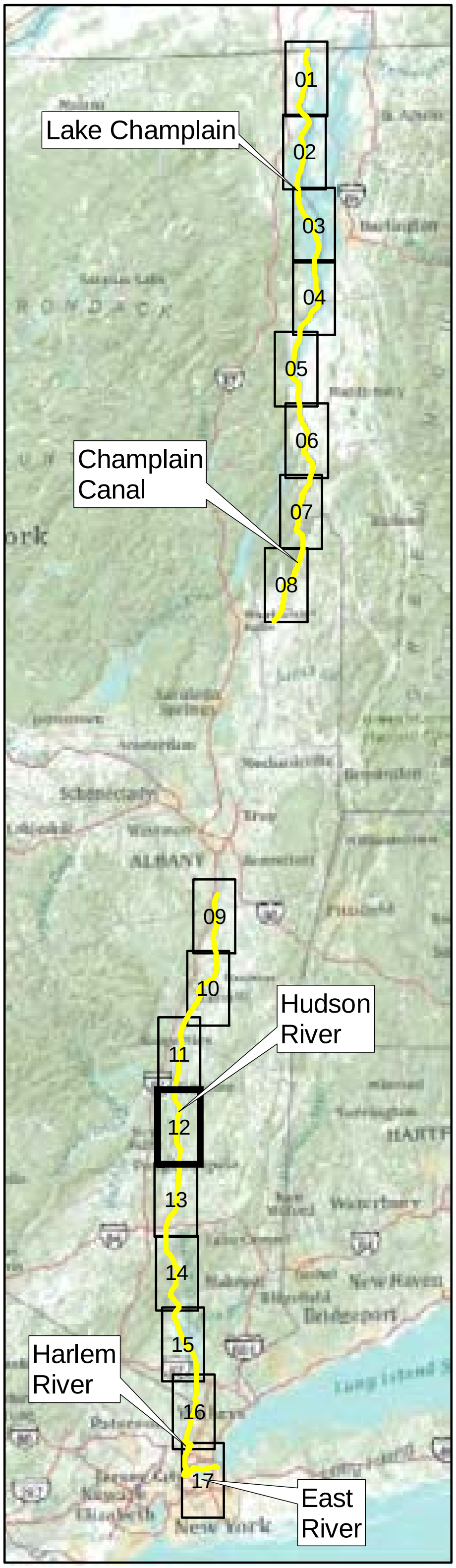
Sediment Core and Benthic Grab Locations

SOURCES: ESRI, NAIP, TDI, TRC, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYDEC)

0 1 2 Miles

0 5,000 10,000 Feet

Sheet 11 of 17



Benthic Grab Sample

Sediment Core Samples

- Physical Sample
- Physical/Chemical Sample
- Physical/Chemical Sample with Dioxin
- Physical and PCB only Sample
- Proposed Underwater Cable Route

Transmission Developers Inc. HDR

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

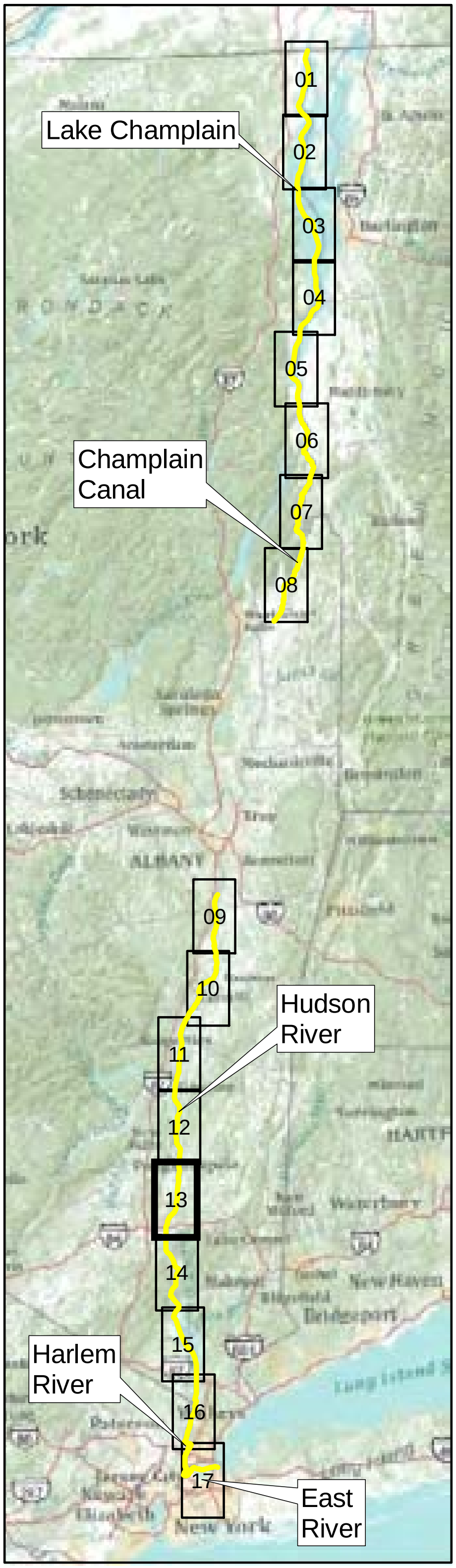
Sediment Core and Benthic Grab Locations

SOURCES: ESRI, NAIP, TDI, TRC, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYDEC)

0 1 2 Miles

0 5,000 10,000 Feet

N



Benthic Grab Sample

Sediment Core Samples

- Physical Sample
- Physical/Chemical Sample
- Physical/Chemical Sample with Dioxin
- Physical and PCB only Sample
- Proposed Underwater Cable Route

Transmission Developers Inc.

HDR

Champlain Hudson Power Express Project

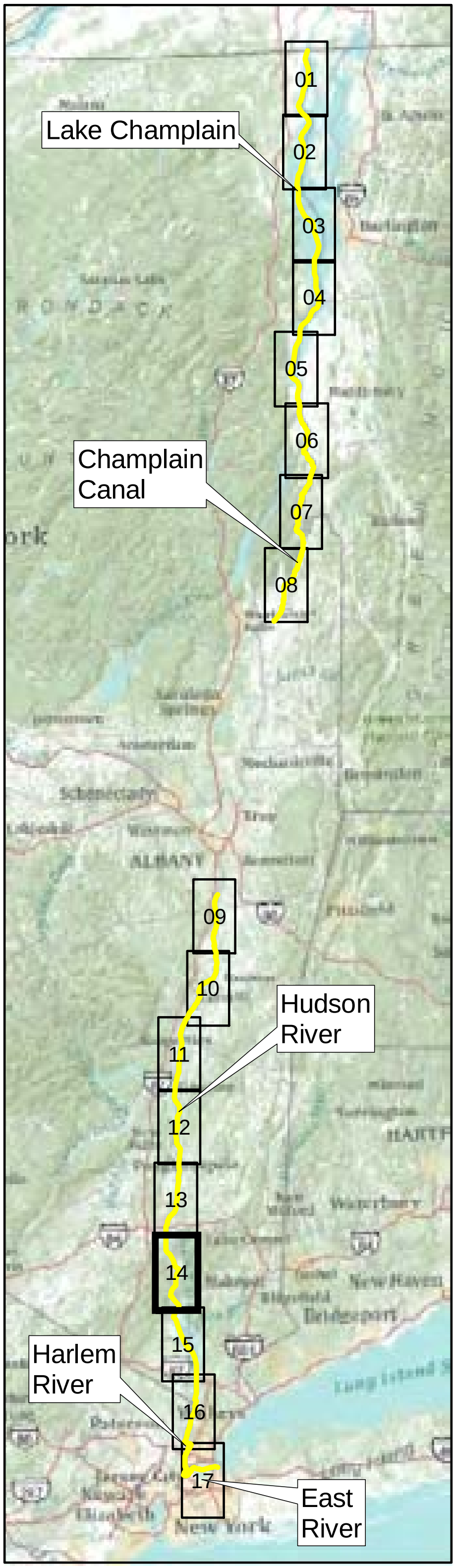
Champlain Hudson Power Express Inc.

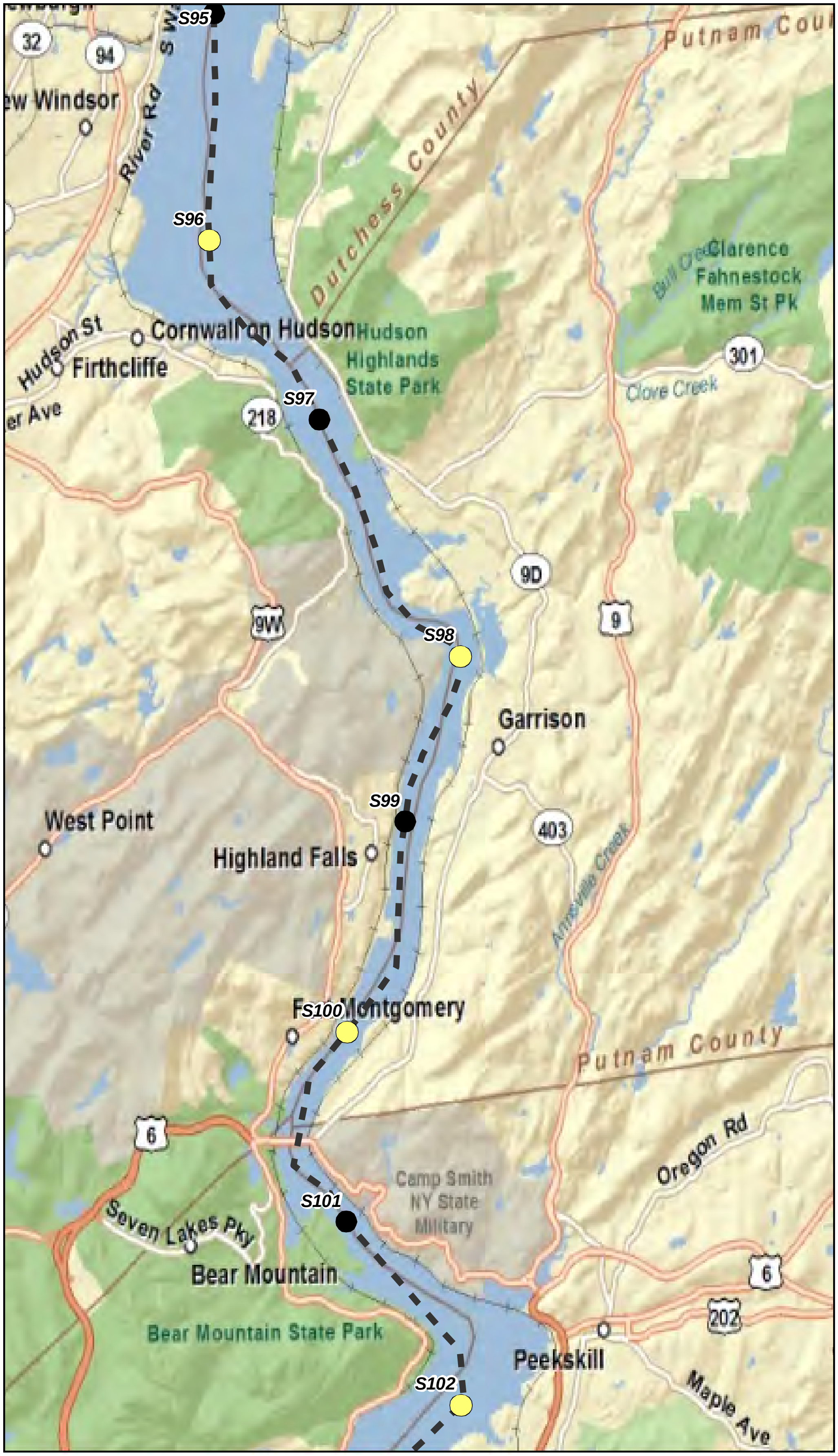
Sediment Core and Benthic Grab Locations

SOURCES: ESRI, NAIP, TDI, TRC, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYDEC)

0 1 2 Miles

0 5,000 10,000 Feet





Benthic Grab Sample

Sediment Core Samples

- Physical Sample
- Physical/Chemical Sample
- Physical/Chemical Sample with Dioxin
- Physical and PCB only Sample

Proposed Underwater Cable Route

Transmission Developers Inc.

HDR

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

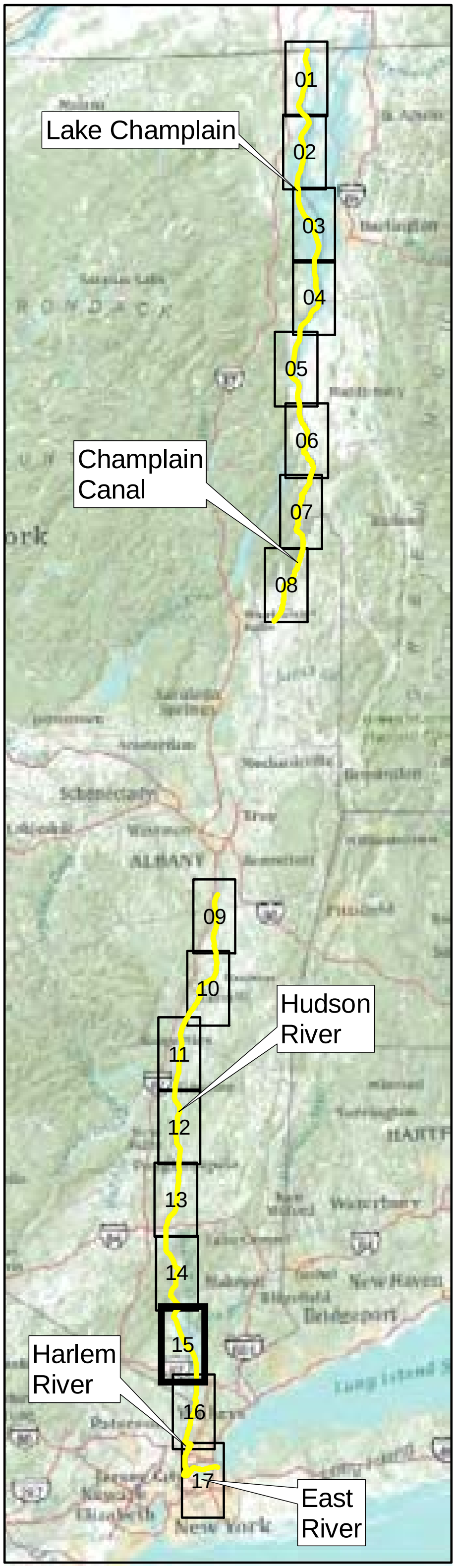
Sediment Core and Benthic Grab Locations

SOURCES: ESRI, NAIP, TDI, TRC, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYDEC)

0 1 2 Miles

0 5,000 10,000 Feet

Sheet 14 of 17



- Benthic Grab Sample

Sediment Core Samples

- Physical Sample
- Physical/Chemical Sample
- Physical/Chemical Sample with Dioxin
- Physical and PCB only Sample
- Proposed Underwater Cable Route

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

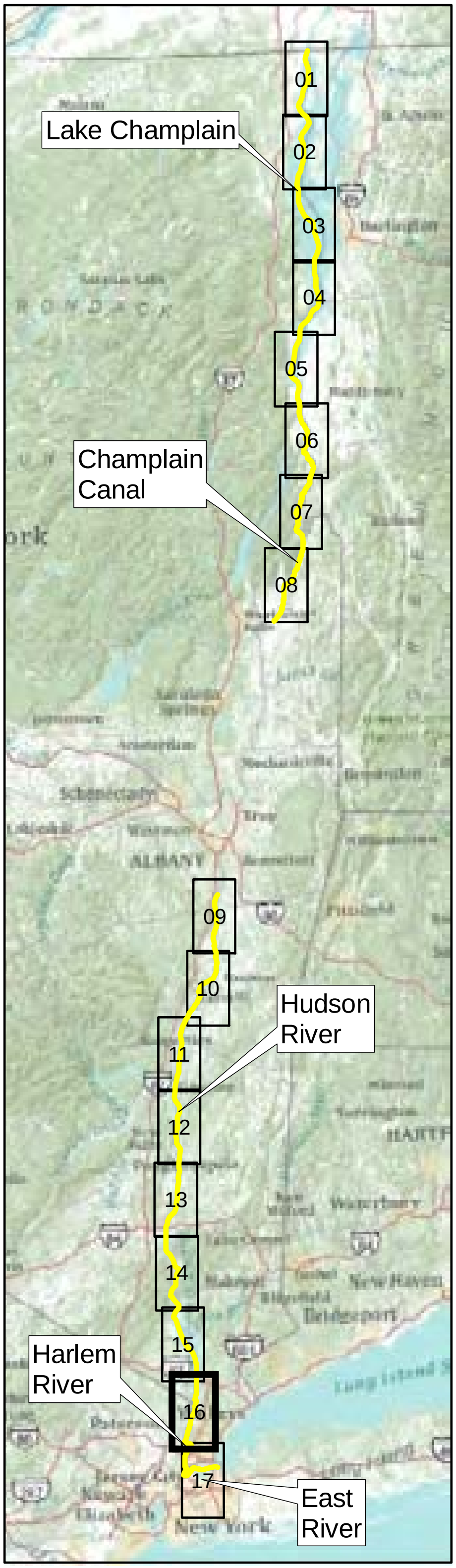
Sediment Core and Benthic Grab Locations

SOURCES: ESRI, NAIP, TDI, TRC, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYDEC)

0 1 2 Miles

0 5,000 10,000 Feet

Sheet 15 of 17



Benthic Grab Sample

Sediment Core Samples

- Physical Sample
- Physical/Chemical Sample
- Physical/Chemical Sample with Dioxin
- Physical and PCB only Sample
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Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

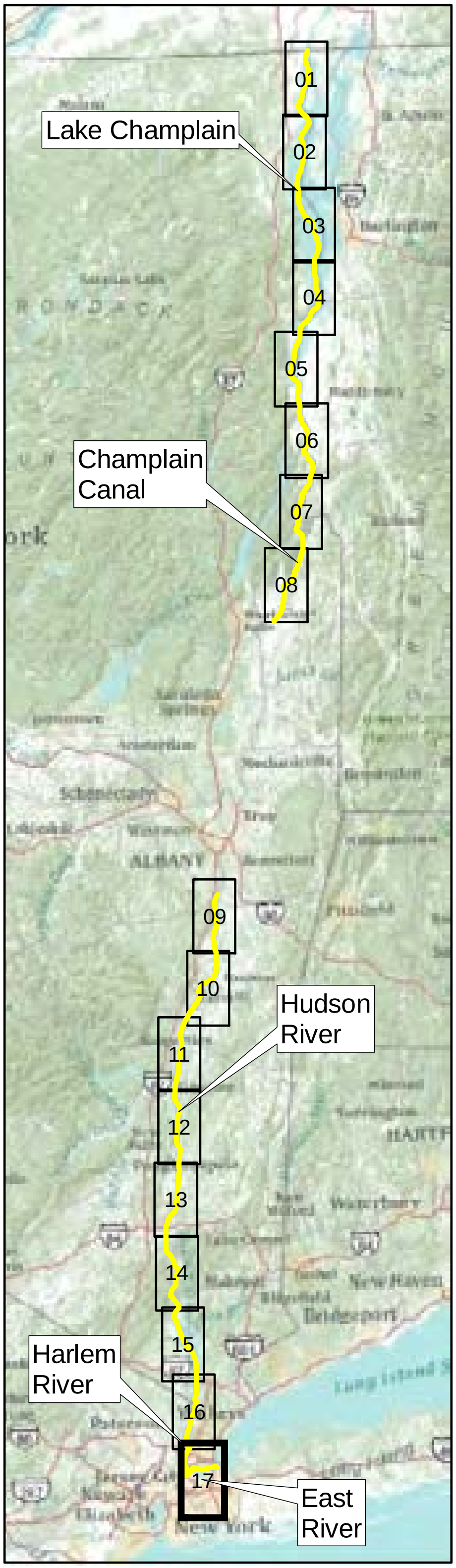
Sediment Core and Benthic Grab Locations

SOURCES: ESRI, NAIP, TDI, TRC, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYDEC)

0 1 2 Miles

0 5,000 10,000 Feet

Sheet 16 of 17



- Benthic Grab Sample

Sediment Core Samples

- Physical Sample
- Physical/Chemical Sample
- Physical/Chemical Sample with Dioxin
- Physical and PCB only Sample
- Proposed Underwater Cable Route

Transmission Developers Inc.

HDR

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

Sediment Core and Benthic Grab Locations

SOURCES: ESRI, NAIP, TDI, TRC, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYDEC)

0 1 2 Miles

0 5,000 10,000 Feet

Sheet 17 of 17

CONFIDENTIAL

APPENDIX B

Marine Route Survey Technical Reports and Drawings

Appendix B of the Marine Route Survey contains Confidential Information and filed with the Public Service Commission Chief Administrative Law Judge pursuant to New York's Freedom of Information Law and 16 N.Y.C.R.R. § 6-1.4.

APPENDIX B

Marine Route Survey Technical Reports

Part III

Sediment Survey: Harlem River, East River and Long Island Sound
Benthic Survey: Harlem River, East River and Long Island Sound

Champlain Hudson Power Express Project

Attachment E: Marine Route Survey
Appendix B Part III

Sediment Survey Technical Report
Harlem River
East River
Long Island Sound

July 2010

TABLE OF CONTENTS

SECTION NO. **PAGE NO.**

LIST OF TABLES

LIST OF ATTACHMENTS (on CD)

1.0 INTRODUCTION

Champlain Hudson Power Express Inc (CHPEI) a subsidiary of Transmission Developers Incorporated (TDI) is proposing to develop an underwater high-voltage direct current (HVDC) transmission line project located in New York and Connecticut—the Champlain Hudson Power Express (Project). The goal of CHPEI is to develop a transmission project that relieves highly congested areas in an environmentally responsible manner. Using HVDC cables, CHPEI's project will link trapped generation such as wind and other renewables with markets that are experiencing acute power shortages. The use of HVDC cable technology avoids the visual and electromagnetic field (EMF) impacts of overhead transmission projects by installing cables out of sight either underwater or underground.

The selection of the proposed cable corridor route took into consideration water depths, sea floor geology, contaminated sediments, fishing activities, restricted areas, environmentally sensitive areas, cultural resources and physical obstacles. In order to further refine the underwater transmission cable route, a Marine Route Survey was conducted during 2010. The Marine Route Survey included hydrographic, geophysical, sediment, and benthic invertebrate surveys. This document describes the sediment sampling and analysis completed during the 2010 survey.

2.0 SEDIMENT SAMPLING

Ocean Survey, Inc (OSI) collected sediment core samples for physical and chemical analysis in the Harlem River, East River and Long Island Sound. Sediment cores were transported by OSI to HDR Nanuet Laboratory for sampling and processing. Cores samples were analyzed by Alpha Analytical, Inc. (Alpha).

In general, sediment samples were collected at systematically determined intervals along the proposed transmission cable route for either physical analysis or both chemical and physical analyses. The number of samples collected within each segment of the transmission cable route varies based on the existing sediment type, data, existence of recent historic sediment quality data, and proximity of proposed route to historic sampling locations.

In general cores were analyzed for the following physical analysis:

- USCS Classification – ASTM D 2487-06
- Moisture Content – ASTM D2216-05
- Specific Gravity – ASTM D 854-06
- Moisture, Ash and Organic Matter – ASTM D 2974
- Particle Size – ASTM D 422-63
- Atterberg Limits – ASTM D 4318-05
- Pocket Penetrometer
- Hand Held Torvane Test Results

- Direct Shear Test – ASTM D 3080
- Consolidation Test – ASTM D 2435-04-B
- Unconsolidated Indrained Triaxial Test – ASTM D 2850

Chemical analysis included:

- Metals using U.S. Environmental Protection Agency (USEPA) methods 6020A, 7474, and 9010B/9014
- Polycyclic aromatic hydrocarbons (PAHs) using USEPA methods 8270C-SIM
- Pesticides using USEPA method 8081
- Polychlorinated Biphenyls (PCBs) using USEPA method 8082 A
- Dioxin using USEPA method 1613B

Chemical results were compared to NYSDEC Technical and Operation Guidance Series (TOGS) 5.1.9, *Sediment Quality Threshold Values for Dredging, Riparian or In-water Placement,* which provides three classifications (Class A, Class B, and Class C) for sediment based on known and presumed impacts on aquatic organisms/ecosystems.

Class A - No Toxicity to aquatic life. If sediment chemistry is found to be at or below the chemical concentrations which define this class, dredging and in-water or riparian placement, at approved locations, can generally proceed.

Class B - Chronic Toxicity to aquatic life. Dredging and riparian placement may be conducted with several restrictions. These restrictions may be applied based upon site-specific concerns and knowledge coupled with sediment evaluation.

Class C - Acute Toxicity to aquatic life. Class C dredged material is expected to be acutely toxic to aquatic biota and therefore, dredging and disposal requirements may be stringent. In water construction activities may require a method that minimizes the loss of resuspended sediment and use of a closed bucket is required during dredging.

TOGS 5.1.9 represents dioxins as the sum of toxic equivalency of 2,3,7,8-TCDD. This value is attained by multiplying the laboratory result of each dioxin/furan compound by the toxicity equivalency factor (TEF) and then summing the products. TOGS 5.1.9 does not specify a treatment for non-detect laboratory results in the toxicity equivalence calculation. Tables 3, and 4 of this document and the full data tables in Attachment 4 present the toxicity equivalence when non-detects are treated as zeros as well as when they are treated as half of the laboratory reporting limit, which is a more conservative approach.

Additionally, chemical results were compared to the ER-L and ER-M levels. Most historic sediment sampling programs analyzed chemical constituents covering a broad spatial and temporal scale using cores and/or sediment grabs. Concentrations of contaminants found in the sediment were compared to the effects range-median (ER-M) concentration, which corresponds to the median (50th percentile) concentrations associated with adverse biological effects and the effects range-low (ER-L) concentrations which have a 10% probability (10th percentile) of inducing adverse biological effects. Generally speaking, ER-M concentrations cause observable adverse effects in organisms and biological communities, while ER-L concentrations are those where biological effects begin to be observed. The ER-L and ER-M concentrations for common analytes are shown in Table 1.

2.1 Sample Collection

OSI field crews conducted shallow subsurface sediment sampling to collect physical samples of the seabed in the upper 5-15 feet using a vibracore sampling system to ground truth seismic profiles and provide samples for chemical and physical analysis (in association with HDR) vibracore operations were performed onboard the *R/V CanDu*, specifically setup for shallow water geotechnical work with hydraulic anchoring capabilities and a derrick with a winch over a moon pool for vibracore rig deployment and recovery. The BH1500 pneumatic vibracore rig was prepared for the collection of 5-foot samples in Long Island Sound and 15-foot samples in the Harlem and East Rivers. The *R/V CanDu* has a sophisticated hydraulic anchoring system that allows 3- to 4-point secure mooring of the vessel to prevent the platform from drifting off station. Once anchored onsite, the vibracore rig is raised below the derrick and lowered through the moon pool into the water.

After penetrating to the desired depth of interest or meeting refusal at a shallower depth, the vibracore was raised to recover the sample on deck. All cores were cut into approximate 5-foot lengths and stored upright in a storage cooler until arriving at the dock, where the cores were transferred to a second storage cooler on an OSI delivery vehicle. The core samples were delivered with chain-of-custody (COC) forms to the HDR laboratory in Nanuet, New York within 24 hours of collection.

Details of the sample collection including survey equipment, a chronology of sampling events, field calibration results, and a vibracore summary table can be found as part of the OSI Technical Report found in Appendix B Part III of the overall Marine Survey Summary Report.

2.2 Laboratory Sampling Procedures

Cores were delivered to the HDR Nanuet laboratory facility by OSI and relinquished under COC within 24 hours of sample collection. HDR longitudinally split one core from each location. The spilt sample was described by a geologist, photographed and sampled for chemical analysis. The remaining core was cut and capped for undisturbed physical analysis.
Each core was described on the core log. Completed core logs are included in Attachment 2 and include sediment color, presence of sediment stratification, visual observation of grain

size, general observation of cohesiveness and odor. Descriptions were based on the Burmeister grain-size classification. This method provided for the identification of the dominant and accessory grain sizes present in terms of a percentage of the total sample by volume. Sediment consistency, structure if any, density (qualitative description), odor and plasticity (qualitative description if clay is present in a sufficient percentage) were also described. Differences in sediment composition in core-length (i.e., stratification) were noted and the depth of each distinct sediment layer (greater than 30% of the core layer), measured from the top of the sediment cores, were recorded. Each sediment core was photographed. A completed photograph log is included in Attachment 3.

The sample(s) were collected along the center of the core using a clean stainless steel spoon and composited in a stainless steel bowl. Composite sediment samples were mixed to a uniform color and consistency. A representative 2-foot sample was cut from the undisturbed core. The sample was capped, labeled for shipment and forwarded under COC to Alpha's analytical laboratory for physical analysis. Chemical samples were transferred to the appropriate jars for the chemical analyses as required by the laboratory. Once collected samples were placed in iced coolers and transported under COC to Alpha.

2.2.1 Quality Assurance

Quality Assurance/Quality Control (QA/QC) samples were taken for chemical analysis. A blind duplicate was retained for 10% of the samples collected (one every 10 samples). Matrix Spike and Matrix Spike Duplicate (MS/MSD) samples were collected one for every 20 samples sent for chemical analysis. Results of the QA/QC samples are included in the data tables detailed in Section 3.3.

2.3 Results of Physical and Chemical Analysis

2.3.1 Harlem and East Rivers

2.3.1.1 Harlem River

Sediment cores were collected at 6 stations, S120 through S125, in the Harlem River to supplement datasets from the USACE study area reports, U.S. Fish and Wildlife, and CARP in the areas of the proposed cable route. Sample locations are depicted in Attachment 1. Each core had a targeted depth of 15 feet below the river bottom. S120 and S123 were able to penetrate to a total depth of 16 feet without encountering any obstruction. Core recoveries were 16.1 feet and 14.6 feet respectively. Two cores (01 and 02) were advanced at stations S120 and S123. The first cores were composited from 0 to 5 feet, in accordance with the SSAP, for chemical analysis. The 3- to 5-foot sections of the second cores were preserved as an undisturbed sample for physical analysis. Due to obstructions, limited penetration and limited recovery, four core attempts were made at locations S121, S122 and S124.

At station S121cores 01 and 02 had 3.5 feet of penetration and 3.0 feet of recovery. Core 01 was discarded. Core 02 was preserved as an undisturbed sample for physical analysis. Core 03 penetrated 6.9 feet with 6.3 feet of recovery and was composited from 0 to 3 feet in accordance with the SSAP for chemical analysis. Core 04 penetrated 3.1 feet with 2.6 feet of recovery and was discarded.

At station S122 core 01 penetrated 9.5 feet with 9.4 feet of recovery and was composited in accordance with the SSAP for chemical analysis. Core 02 penetrated 7.7 feet with 8.0 feet of recovery and was preserved as an undisturbed sample for physical analysis. Core 03 penetrated 7.1 feet with 6.9 feet of recovery and was discarded as well as core 4 which penetrated 7.6 feet with 7.6 feet of recovery.

At station S124 cores 01 and 02 were discarded they had 1.4 and 0.2 feet of penetration and 0.8 and 0.2 feet of recovery respectively. Core 03 penetrated 14 feet with 13.5 feet of recovery and was composited from 0 to 13.5 feet for chemical analysis, in accordance with the SSAP. Core 04 which penetrated 12.3 feet with 12.2 feet of recovery was preserved as an undisturbed sample for physical analysis.

At station S125 penetration ranged from 11 to 18 feet below the river bottom. A visual inspection of Cores 01 and 02 indicated that the sediments had been impacted by a dense petroleum-like substance from an unknown source. The S125 station was offset as the cores collected did not meet acceptable depth or recovery as per the SSAP. Two additional cores were collected (03 and 04). All four cores were delivered to the laboratory. Cores 01 and 02 were disposed of at an appropriately licensed facility. Cores 03 and 04 were sampled for physical and chemical analysis. They exhibited a strong odor. CHPEI notified NYSDEC of the conditions encountered at this location via the NYS Spills Hotline and NYSDEC spill number 1001382 was assigned.

The sediments logged from stations S120 through S125 can generally be characterized as gray to black sands and silts with trace clay and organics. A layer of slightly fibrous degraded organics was observed at stations S120, S121, and S122 at the 0- to 3.5-foot, 3.5- to 6-foot, and 5- to 10-foot intervals respectively. Additionally, silt and clay were observed in the 0- to 5-foot interval at station S122. Detailed core logs are included as Attachment 2. Consolidation increased with depth in each core. Unified Soil Classification System (USCS) classification of the undisturbed cores using ASTM method D 24870-06 varied including SM – silty sand/silty sand with gravel, ML – silt with sand, SP – poorly graded sand with gravel, CH – fat clay, and MH – elastic silt. A summary of the physical analyses and results is shown on Table 2 and full laboratory results are included as Attachment 5.

The Harlem River is in an urban area with mixed use including, residential, commercial, and industrial development. It has degraded sediment quality due to the point sources located along the shorelines, particularly the many combined sewer outfalls (CSOs). Chemical analysis of the composited samples was performed in order to better characterize contaminants along the underwater cable route. Chemical analyses included metals, PAHs, pesticides, PCBs, and dioxin.

Metals concentrations were below the ER-L and Class A levels in samples S120, S121 and S124. Metals were detected above the ER-L but below the ER-M levels in samples S122, and S123, all concentrations were below the Class A level. Multiple metals exceeded the ER-L and ER-M values in the sample from S125. Additionally the mercury concentration detected in this sample was within TOGS Class C.

There were no PAH compounds detected in samples taken from stations S120 or S123. Samples from stations S121, S122, and S124 had multiple PAH compounds detected above the ER-L value. Additionally, concentrations of phenanthrene and fluoranthene exceeded the ER-M values in samples S121 and S122 respectively. Multiple PAH compounds exceeded the ER-M values at station S125. Total detected PAH compounds from stations S121, and S122, were within the Class B levels. Total PAH compounds detected in the sample from station S125 were within Class C. All other samples fell within the Class A levels.

There were no pesticides detected in the samples from station S120 through S124 with the exception of 4-4'-DDD which was detected above the ER-L at stations S121 and S122, putting the total DDD/E/T for these areas in Class B. Detected pesticides in the S125 sample were all above the ER-M values with the exception of endrin. The total detected DDD/E/T compounds fall within Class C.

Detected PCB concentrations were all below the Class A values with the exception of the sample taken at station S125. Sample S125 exceeded the Class A level for PCBs when calculated in accordance with TOGS 5.1.9 (sum of the 20 congeners multiplied by 2).

Dioxins were detected in samples from stations S122 and S124. The 2,3,7,8-TCDD toxicity equivalence met TOGS 5.1.9 Class A standards when non-detects were treated as zeros. No dioxin isomers were detected in either sample interval at station S120 (0 to 11ft and 11-15ft). All four samples fall into Class B when one half of the reporting limit is used to calculate the toxicity equivalence to 2,3,7,8-TCDD.

Table 3 shows a summary of the exceedances in the Harlem River. Full data tables are included in Attachment 4.

2.3.1.2 East River

Sediment cores were attempted at 4 stations, S126 through S129, in the East River to supplement datasets from the USACE study area reports, U.S. Fish and Wildlife, and CARP in the areas of the proposed cable route. Sample locations are depicted in Attachment 1. Each core had a targeted depth of 15 feet below the river bottom. S126 was attempted 4 times but encountered refusal on rock at the river bottom. Two cores (01 and 02) were advanced at station S129 and penetrated to a depth of 16 feet without obstruction. The first core was composited from 0 to 15 feet, in accordance with the SSAP, for chemical analysis. The 13- to 15-foot section of the second core was preserved as an undisturbed sample for physical analysis. Due to obstructions, limited penetration and limited recovery, three core attempts were made at locations S127 and S128. Cores 01 penetrated 11.5 and 11.6 feet below the river bottom respectively. Penetration for cores 02 and 03 ranged from 14.9 to 15.9 without encountering obstruction. Core 01 was discarded from both stations. Cores 02 were composited in accordance with the SSAP for chemical analysis. Cores 03 were preserved as undisturbed samples for physical analysis.

The sediments logged from stations S127 through S129 varied. Sediments from station S127 included brown sands in the 0- to 10-foot interval and grey silty clay in the 10.5- to 15.5-foot interval. Sediments from station S128 were mostly homogenous and included black silts/very fine sands and clay with the exception of the 13.5- to 15-foot interval that was fine to coarse gravel. S129 was generally grey clayey silts and was homogenous. Detailed core logs are included as Attachment 2. Consolidation increased with depth in each core. Unified Soil Classification System (USCS) classification of the undisturbed cores using ASTM method D 24870-06 varied including SP – poorly graded sand and CH – fat clay (S127), SC – clayey sand (S128), and MH – elastic silt (S129). A summary of the physical analyses and results is shown on Table 2 and full laboratory results are included as Attachment 5.

In and around New York City, the major sources of contaminated sediments include industrial discharges, wastewater treatment plant discharges, CSOs, stormwater runoff, non-point source discharges, atmospheric deposition, and chemical and oil spills (USFWS 1997). The East river is urban mixed with residential, commercial, and industrial development, and has degraded sediment quality due to the point sources located along the shorelines, particularly the many CSOs.

Detected metals concentrations were generally below the ER-L and Class A levels with the exception of nickel in at station S127, arsenic and mercury at station S128 and arsenic at station S129 which exceeded the ER-L values and arsenic and mercury in sample S128 which exceeded the Class A values and was classified in category B.

Samples from stations S127 and S128 exceeded the ER-L values for multiple compounds. Multiple compounds in sample S128 also exceeded the ER-M values. There were no exceedances in the compounds detected in the samples from station S129. Total detected PAH compounds in samples S127 and S128 were categorized in Class B. Compounds in sample S129 were all within Class A levels.

None of the four East River samples analyzed for dioxins (S127 0-10.5’, S127 10.5’-15.5’, S128 and S129) exceeded the TOGS 5.1.9 Class A standard when non-detects were treated as zero in the 2,3,7,8-TCDD toxicity equivalence calculation. All four samples fall into the Class B standard when non-detects were represented by half of the reporting limit for each individual dioxin/furan compound. There were no pesticides or PCBs detected in any of the East River samples. Full data tables are included in Attachment 4.

2.3.2 Long Island Sound (New York)

Sediment cores were collected at 8 stations, S130 through S137, in the New York waters of Long Island Sound to supplement published sediment data in the areas of the proposed cable route. Sample locations are depicted in Attachment 1. Each core had a targeted depth of five feet and was able to penetrate to a depth of at least six feet. Core recoveries ranged from 4.8 to 6.3 feet. Two cores (01 and 02) were advanced at each station. The first cores were composited from 0 to 5 feet, in accordance with the SSAP, for chemical analysis. The 3- to 5-foot sections of the second core were preserved as an undisturbed sample for physical analysis.

The sediments logged from stations S130 through S137 can generally be characterized as gray to black silty clay or clayey silt with trace sand and organics. Detailed core logs are included as Attachment 2. Consolidation increased with depth in each core. The cores were homogeneous with the exception of core S130-01 which contained gray fine to coarse sand and silt in the 4- to 5-foot interval. Unified Soil Classification System (USCS) classification of the 3- to 5-foot intervals using ASTM method D 24870-06 classified the sediments as CH – fat clay, with the exception of S134 and S136 which were classified as MH – elastic silt. A summary of the physical analyses and results is shown on Table 2 and full laboratory results are included as Attachment 5.

Major cities and rivers have introduced contaminants into Long Island Sound from multiple sources, including sewage effluent, disposal of dredged material, industrial discharges, urban and agricultural runoff, and atmospheric deposition (USGS 2009). Many contaminants adsorb to organic sediment particles and are deposited on the seafloor. Chemical analysis of the composited samples was performed in order to better characterize contaminants along the cable route. Chemical analyses included metals, PAHs, pesticides, and PCBs.

Metals concentrations were detected above the ER-L but below the ER-M levels in all eight samples with the exception of mercury in sample S133 which was detected slightly above the ER-M of 0.71 mg/kg at 0.758 mg/kg. Samples S130 through S134 had multiple compounds detected at TOGS Class B levels including cadmium, copper, lead and mercury. Concentrations generally decreased from western Long Island Sound (sample S130) to the east (sample S137). Copper and mercury were detected slightly above Class A in sample S136 and copper was detected slightly above Class A in S135. All other detected metals concentrations in samples S135, S136 and S137 were within the Class A values. There were no metals detected in Class C (exceeding Class B).

Similarly, concentrations of PAH compounds decreased from western Long Island Sound to the east. Samples S130 through S133 had multiple compounds detected above the ER-L value. Additionally, compounds, including acenaphthylene, benzo[a]anthracene, benzo[a]pyrene, dibenz[a.h]anthracene, and pyrene, were detected above the ER-M in sample S130. Acenaphthylene was detected above the ER-L in sample S134. All other compounds detected in samples S134 through S137 were below the ER-L value. In samples S130, S131, S132 and S133 total detected PAHs were above the ER-L but below the ER-M and fell within Class B. Total detected PAHs in all other samples were below the ER-L and Class A values.

There were no pesticides detected in samples S132, S135, S136 or S137. Total DDD/E/T was detected above the ER-L but below the ER-M in samples S130, S131, S133 and S134, and multiple compounds including 4,4'-DDD, 4,4'-DDE and 4,4'-DDT were detected above the ER-L but below the ER-M.

Detected PCB concentrations were all below the Class A values with the exception of the sample S133. Sample S133 exceeded the Class A level for PCBs when calculated in accordance with TOGS 5.1.9 (sum of the 20 congeners multiplied by 2). Table 4 shows a summary of the exceedances in the Long Island Sound. Full data tables are included in Attachment 4.

3.0 SUMMARY

The marine survey data provided two basic types of information: 1) the physical characteristics of the sediments which influence the proposed installation technique for the cable as well as the cable engineering and design; and 2) the chemical characteristics of the sediments, specifically the presence of chemical contamination.

Overall, sediment type varied along the route from coarse grains to silts and clays. However, sediment cores exhibited little stratification at each location. Sediment type and physical analysis data will be used in the engineering of the cable and to refine and plan cable installation techniques.

Sediment quality varied along the proposed underwater transmission cable route and, sediment quality within the Harlem River, East River and Long Island sound has been impacted due to industrial discharges, wastewater treatment plant discharges, CSOs, stormwater runoff, non-point source discharges, atmospheric deposition, and chemical and oil spills.

All 3 Classes of sediments were found along the proposed underwater transmission cable route. In most cases exceedances were for a single compound. Where possible the route will avoid known areas of high concentrations of contaminants. In addition, water quality modeling is being conducted to assess the potential impacts to water quality standards. If based on model results, there are potential impacts to water quality standards, CHPEI will develop methods to minimize the impact during installation to assure water quality (WQ) standards are met.

TABLE 1
ER-L AND ER-M CONCENTRATIONS FOR COMMON ANALYTES*

Chemical Analyte	ER-L Concentration	ER-M Concentration
Trace Elements (ppm)		
Antimony	2	25
Arsenic	8.2	70
Cadmium	1.2	9.6
Chromium	81	370
Copper	34	270
Lead	43.7	218
Mercury	0.15	0.71
Nickel	20.9	51.6
Silver	1	3.7
Zinc	150	410
DDT and Metabolites (ppb)		
DDT	1	7
DDD	2	20
DDE	2	15
Total DDT	1.58	46.1
Other Pesticides (ppb)		
Chlordane	0.5	6
Dieldrin	0.02	8
Endrin	0.02	45
Polynuclear Aromatic Hydrocarbons (ppb)		
Acenaphthene	16	500
Acenaphthylene	44	640
Anthracene	85.3	1,100
Benzo(a)anthracene	261	1,600
Benzo(a)pyrene	430	1,600
Chrysene	384	2,800
Dibenzo(a,h)anthracene	63.4	260
Fluoranthene	600	5,100
Fluorene	19	540
2-Methylnaphthalene	70	670
Naphthalene	160	2,100
Phenanthrene	240	1,500
Pyrene	665	2,600
Total PAH	4,022	44,792

**Adapted from Adams and Benyi (2003).*

TABLE 2
Physical Results Summary
Champlain Hudson Power Express

Boring	Sample Number	Depth (ft)	Visual Description	USCS Classification ASTM D 2487-06	Moisture Content ASTM D2216-05 %	Specific Gravity ASTM D 854-06	Moisture, Ash and Organic Matter ASTM D 2974: Moisture Content %	Ash Content %	Organic Matter %	Particle Size ASTM D 422-63: % Gravel	% Sand	% Silt & Clay	%< .0015/.0014 mm	Atterberg Limits ASTM D 4318-05: Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Pocket Penetrometer and Hand Held Torvane Test Results ("T" denotes reading from top of sample "B" denotes reading from bottom of sample): Pocket Penetrometer tsf	Pocket Penetrometer psf	Hand Held Torvane tsf	Hand Held Torvane psf
HAR-S120	02	8-10	Moist, olive brown silty sand	SM - silty sand	12.8	2.79	13	99.8	0.2	12.3	42.3	45.4	2	non-plastic				T:1.2 B:0.5	T:2400 B:1000	T:0.04 B:0.02	T:80 B:40
		13-15	Moist, dark grayish brown silt with sand	ML - silt with sand	18.2	2.74	19	99.8	0.2	0.0	29.7	70.3	2	non-plastic				T:4.5 B:2.75	T:9000 B:5500	T:0.15 B:0.18	T:300 B:350
HAR-S121	02	1-3	Moist, dark brown sand with gravel	SP - poorly graded sand with gravel	16.7	2.65 2.96 (coarse) 2.52 (fine)	17	99.3	0.7	31.9	63.6	4.5	1	non-plastic				T:1 B:0.5	T:2000 B:1000	T:0.04 B:0.04	T:70 B:70
HAR-S122	02	0-2	Wet, very dark grey silty clay	CH - fat clay	102.7	2.68	100	96.8	3.2	0.0	2.5	97.5	38	96	39	57	1	T:0 B:0	T:0 B:0	T:0.08 B:0.08	T:152 B:168
HAR-S123	02	13-15	Wet, very dark gray silt	MH - elastic silt	140.8	2.52	145	92.8	7.2	0.0	3.7	96.3	41	134	52	82	1	T:0 B:0	T:0 B:0	T:0.08 B:0.06	T:160 B:120
HAR-S124	04	10-12	Moist, olive brown silty sand	SM - silty sand	22.6	2.69	23	99.5	0.5	0.0	59.8	40.2	0	non-plastic				T:1.5 B:1.75	T:3000 B:3500	T:0.05 B:0.03	T:100 B:60
HAR-S125	04	8-10	Moist, black silty sand with gravel	SM - silty sand with gravel	64.4	2.29	64	88.1	11.9	31.0	41.9	27.1	7	non-plastic				T:0 B:0	T:0 B:0	T:0.06 B:0.05	T:128 B:100
EAS-S127	03	3-5	Moist, olive brown sand	SP - poorly graded sand	18.5	2.73	18	99.9	0.1	0.8	94.6	4.6	1	non-plastic				T:1.5 B: 2.25	T:3000 B:4500	T:0.01 B:0.01	T:20 B:20
		13-15	Moist, very dark grey clay	CH - fat clay	85	2.71	84	95.1	4.9	1.0	3.9	95.1	38	95	37	58	1	T:0.25 B:0.25	T:500 B:500	T:0.14 B:0.16	T:280 B:320
EAS-S128	03	10-12	Wet, very dark gray clayey sand	SC - clayey sand	45.2	2.70	44	99.3	0.7	1.7	60.4	37.9	16	36	17	19	1	T:0.0 B:0.0	T:0.0 B:0.0	T:0.05 B:0.10	T:100 B:200
EAS-S129	02	13-15	Wet, very dark gray silt	MH - elastic silt	122.2	2.68	118	97.2	2.8	0.0	3.3	96.7	39	100	43	57	1	T:0.0 B:0.0	T:0.0 B:0.0	T:0.09 B:0.08	T:184 B:156
LIS-S130	02	3-5	Wet, very dark gray clay	CH - fat clay	120.2	2.66	120	97.4	2.6	0.0	4.7	95.3	36	106	39	67	1	T:0.0 B:0.0	T:0.0 B:0.0	T:0.06 B:0.07	T:116 B:144
LIS-S131	02	3-5	Wet, black clay	CH - fat clay	212.5	2.59	201	95.4	4.6	0.3	5.3	94.4	46	177	58	119	1	T:0.0 B:0.0	T:0.0 B:0.0	T:0.04 B:0.04	T:80 B:88
LIS-S132	02	3-5	Wet, olive gray clay	CH - fat clay	126.5	2.67	126	96.3	3.7	1.1	7.4	91.5	36	122	46	76	1	T:0.0 B:0.0	T:0.0 B:0.0	T:0.05 B:0.04	T:96 B:76
LIS-S133	02-A	3-5	Moist, dark olive clay	CH - fat clay	136.4	2.55	136	96.5	3.5	0.0	4.1	95.9	47	141	50	91	1	T:0.0 B:0.0	T:0.0 B:0.0	T:0.02 B:0.03	T:40 B:50
LIS-S134	02-A	3-5	Moist, dark olive gray silt	MH - elastic silt	110.9	2.66	111	96.1	3.9	0.0	2.3	97.7	33	136	52	84	1	T:0.0 B:0.0	T:0.0 B:0.0	T:0.04 B:0.04	T:80 B:84
LIS-S135	02-A	3-5	Wet, dark greenish gray clay	CH - fat clay	181.7	2.27	177	96	4	0.0	0.5	99.5	45	124	44	80	2	T:0.0 B:0.0	T:0.0 B:0.0	T:0.06 B:0.04	T:120 B:76
LIS-S136	02-A	3-5	Wet, very dark gray silt	MH - elastic silt	200.5	2.71	193	97.5	2.5	0.0	0.9	99.1	53	133	52	81	2	T:0.0 B:0.0	T:0.0 B:0.0	T:0.01 B:0.04	T:28 B:80
LIS-S137	02-A	0-2	Wet, olive gray clay	CH - fat clay	160	2.68	160	96	4	0.0	0.2	99.8	33	112	44	68	2	T:0.0 B:0.0	T:0.0 B:0.0	T:0.01 B:0.05	T:12 B:100
		3-5	Wet, dark greenish gray clay	CH - fat clay	153.8	2.70	157	96.2	3.8	0.0	0.6	99.4	44	113	42	71	2	T:0.0 B:0.0	T:0.0 B:0.0	T:0.06 B:0.05	T:120 B:100
LIS-S137	02	3-5																			
LIS-S138	03-A	3-5	Wet, very dark grey clay	CH - fat clay	178.2	2.66	184	94.9	5.1	0.0	1.1	98.9	43	130	47	83	2	T:0.0 B:0.0	T:0.0 B:0.0	T:0.03 B:0.07	T:56 B:144
LIS-S139	02-A	0-2	Wet, dark olive gray clay	CH - fat clay	135.4	2.68	135	96.1	3.9	0.0	2.2	97.8	42	116	42	74	1	T:0.0 B:0.0	T:0.0 B:0.0	T:0.04 B:0.05	T:84 B:96
LIS-S140	02-A	0-2	Wet, very dark gray clay	CH - fat clay	180	2.69	198	96	4	0.0	4.8	95.2	32	131	46	85	2	T:0.0 B:0.0	T:0.0 B:0.0	T:0.02 B:0.06	T:48 B:124
LIS-S141	02-A	3-5	Wet, olive gray silt	MH - elastic silt	130.5	2.68	130	97.1	2.9	0.0	9.3	90.7	31	95	43	52	2	T:0.0 B:0.0	T:0.0 B:0.0	T:0.04 B:0.04	T:80 B:80
LIS-S142	03-A	0-2	Wet, dark gray clay	CH - fat clay	152	2.73	152	96.3	3.7	0.0	2.0	98.0	33	110	42	68	2	T:0.0 B:0.0	T:0.0 B:0.0	T:0.02 B:0.02	T:32 B:32
LIS-S143	03-A	0-2	Wet, very dark grey clayey sand	SC - clayey sand	44.5	2.69	49	98.6	1.4	0.0	73.3	26.7	8	29	19	10	3	T:0 B:1.25	T:0 B:2500	T:0.06 B:0.15	T:116 B:300
		3-5	Moist, gray silty sand	SM - silty sand	15.7	2.74	16	99.5	0.5	0.0	66.9	33.1	13	non-plastic				T:2.75 B:3.25	T:5500 B:6500	T:0.10 B:0.20	T:200 B:400
LIS-S144	02-A	0-2	Wet, dark gray sandy silt	MH - sandy elastic silt	112.5	2.72	112	96.3	3.7	0.0	36.4	63.6	24	75	35	40	2	T:0.0 B:0.0	T:0.0 B:0.0	T:0.08 B:0.05	T:152 B:100
LIS-S145	02-A	0-2	Moist, very dark gray silty sand	SM - silty sand	20.2	2.73	26	98.7	1.3	0.0	70.5	29.5	2	non-plastic				T:0.8 B:0.5	T:1600 B:1000	T:0.04 B:0.06	T:70 B:120
LIS-S146	03-A	0-2	Moist, dark gray sand with silt	SP-SM - poorly graded sand with silt	20.7	2.64	21	99.8	0.2	0.6	93.6	5.8	1	non-plastic				T:1.5 B:1.75	T:3000 B:3500	T:0.04 B:0.08	T:80 B:160
LIS-S147	02-A	0-2	Wet, dark gray clay	CH - fat clay	150.6	2.73	164	96.2	3.8	0.0	11.8	88.2	24	102.0	38.0	64.0	2.0	T:0.0 B:0.0	T:0.0 B:0.0	T:0.01 B:0.02	T:28 B:40
LIS-S148	02-A	0-2	Wet. Very dark gray clay	CH - fat clay	136.7	2.67	145	96.1	3.9	0.0	11.2	88.8	26	108.0	39.0	69.0	1.0	T:0.0 B:0.0	T:0.0 B:0.0	T:0.03 B:0.05	T:56 B:100
LIS-S149	02-A	0-2	Wet, dark gray clay	CH - fat clay	134.3	2.51	134	96.1	3.9	0.0	10.4	89.6	39	91.0	35.0	56.0	2.0	T:0.0 B:0.0	T:0.0 B:0.0	T:0.004 B:0.01	T:8 B:12
LIS-S150	02-A	0-2	Moist, gray clay with sand	CH - fat clay	64.1	2.68	64	97.8	2.2	0.6	19.4	80.0	24	75.0	31.0	44.0	1.0	T:0.0 B:0.0	T:0.0 B:0.0	T:0.01 B:0.01	T:12 B:16
LIS-S151	02-A	0-2	Wet, dark gray sandy clay	CL - sandy lean clay	56.8	2.74	57	98.2	1.8	0.0	48.0	52.0	13	41.0	22.0	19.0	2.0	T:0.0 B:0.0	T:0.0 B:0.0	T:0.06 B:0.07	T:120 B:140
LIS-S152	02-A	0-2	Moist, gray sand	SP - poorly graded sand	22.8	2.70	23	99.8	0.2	0.1	96.1	3.8	1	non-plastic				T:0.75 B:1.75	T:1500 B:3500	T:0.04 T:0.04	T:80 B:80

Boring	Sample Number	Depth (ft)	Direct Shear Test ASTM D 3080: cohesion (c) psi	friction angle (Φ) °	Consolidation Test ASTM D 2435-04-B, Before Test: Water Content %	Dry Unit Weight pcf	Saturation %	Void Ratio	After Test: Water Content %	Dry Unit Weight pcf	Saturation %	Void Ratio	Unconsolidated Indrained Triaxial Test ASTM D 2850: Water Content %	Dry Density pcf	Saturation %	Void Ratio	Confining Stress psi	Undrained Strength psi	Max. Dev. Stress psi	Strain at Failure %	Strain Rate %/min
HAR-S120	02	8-10			18.95	105.7	81.63	0.65	17.23	110.9	84.36	0.57	15.8	78.71	36.4	1.21	4	0.7351	1.47	1.8	1
		13-15											16.9	104.7	73	0.634	4	2.893	5.786	1.3	1
HAR-S121	02	1-3											23.6	78.95	57	1.1	4	5.122	10.24	13.3	1
HAR-S122	02	0-2	0.813	31.2	100.26	45.32	99.82	2.69	34.34	87.11	99.98	0.92	47.6	61.79	74.6	1.71	4	0.5406	1.081	5.83	1
HAR-S123	02	13-15			156.77	30.19	93.81	4.21	54.68	66.15	99.98	1.38	139.2	33.82	96.1	3.65	4	0.9322	1.864	1.01	1
HAR-S124	04	10-12			17.17	113.7	96.77	0.48	14.45	120.9	99.99	0.39	23.5	91.51	75.6	0.835	4	6.514	13.03	14.9	1
HAR-S125	04	8-10			85.69	47.05	96.27	2.04	24.33	91.8	99.98	0.56	45.6	67.02	92.1	1.13	4	1.052	2.104	1.7	1
EAS-S127	03	3-5			18.86	93	61.83	0.83	22.49	105.6	99.99	0.61	10.1	91.56	32.1	0.861	4	0.4944	0.9888	2.4	1
		13-15	0.664	36.9	91.26	47.95	97.83	2.53	36.79	84.72	100	1	91.8	44.68	89.2	2.79	4	1.12	2.241	15	1
EAS-S128	03	10-12											50.5	66.66	89.1	1.53	4	0.5997	1.199	10.2	1
EAS-S129	02	13-15			112.91	39.73	94.23	3.21	40.44	80.29	100	1.08	115.6	37.59	89.8	3.45	4	0.9952	1.99	1.4	1
LIS-S130	02	3-5	0.601	30.0	110.39	42.18	99.97	2.94	30.68	91.43	99.97	0.82									
LIS-S131	02	3-5	1.79	29.4	195.22	26.67	99.87	5.06	35.7	84	99.99	0.92	190.6	24.53	88.3	5.59	4	0.4504	0.9009	1.03	1
LIS-S132	02	3-5			150.29	33.09	99.48	4.02	44.62	75.92	99.99	1.19	137.7	31.69	86.3	4.26	4	1.274	2.549	1.22	1
LIS-S133	02-A	3-5			173.6	26.62	88.87	4.98	52.21	68.28	99.99	1.33	195.5	23.74	87.3	5.71	4	0.07526	0.1505	5.13	1
LIS-S134	02-A	3-5	0.73	28.8	150.74	32.56	97.78	4.1	35.6	85.29	99.99	0.95									
LIS-S135	02-A	3-5	1.18	27.8	121.67	37.61	99.79	2.77	28.55	85.98	99.98	0.65	158.7	30.13	97.3	3.7	4	0.4565	0.9131	2.36	1
LIS-S136	02-A	3-5	0.000363	32.0	174.87	28.84	97.38	4.87	37.46	83.95	99.98	1.02	154	30.36	91.3	4.57	4	0.2353	0.4706	8.07	1
LIS-S137	02-A	0-2			165.49	30.78	99.98	4.44	40.95	79.76	100	1.1	188.7	26.88	96.8	5.22	4	0.2288	0.4576	5.3	1
		3-5	2.68	24.1	135.11	35.5	97.35	3.75	37.19	84.1	99.98	1	108.3	38.52	86.6	3.38	4	0.7992	1.598	1.18	1
LIS-S137	02	3-5	0.838	32.9																	
LIS-S138	03-A	3-5	0.0702	33.4	172.99	29.18	98.11	4.69	50.66	70.74	100	1.35	136.9	33.94	93.6	3.89	4	0.4219	0.8439	3.1	1
LIS-S139	02-A	0-2	0.491	33.4	136.8	35.67	99.35	3.69	41.79	78.92	100	1.12	151.1	32.01	95.8	4.23	4	0.3013	0.6026	10.5	1
LIS-S140	02-A	0-2	0.655	37.9	52.37	68.12	96.15	1.47	22.43	104.7	99.99	0.6	162.6	25.27	77.5	5.65	4	0.3241	0.6482	1.8	1
LIS-S141	02-A	3-5			85.89	50.3	98.94	2.33	28.49	94.87	100	0.76	109.9	39.48	91	3.24	4	0.3453	0.6906	4.54	1
LIS-S142	03-A	0-2	0.349	33.9	138.55	35.61	99.9	3.79	34.65	87.56	99.96	0.95	140.7	32.58	90.8	4.23	4	0.1955	0.3909	0.975	1
LIS-S143	03-A	0-2	1.28	32.9	31.64	90.01	98.29	0.87	12.03	126.9	99.99	0.32	31.4	88.38	93.9	0.9	4	1.012	2.024	1.4	1
		3-5	1.04	36.1	21	107.2	96.58	0.6	17.54	115.5	99.97	0.48	19.8	104.4	84.9	0.638	4	6.735	13.47	15	1
LIS-S144	02-A	0-2	1.22	31.8	73.67	56.08	98.82	2.03	21.7	106.8	99.98	0.59	104.6	44.16	100	2.85	4	0.3561	0.7123	0.954	1
LIS-S145	02-A	0-2											23.3	97.57	85.3	0.747	4	3.995	7.99	9.3	1
LIS-S146	03-A	0-2											8.9	107.5	44.2	0.533	4	0.6961	1.392	1.62	1
LIS-S147	02-A	0-2	1.59	27.9	134.92	36.35	99.85	3.69	37.81	83.85	99.98	1.03	123.4	36.41	91.5	3.68	4	0.7809	1.562	0.575	1
LIS-S148	02-A	0-2	0.43	33.8	113.18	41.34	99.65	3.03	24.84	100.2	99.98	0.66	112.3	37.93	88.4	3.39	4	0.1878	0.3756	11.1	1
LIS-S149	02-A	0-2	0.449	34.9	108.49	42.05	99.86	2.73	25.79	95.11	99.98	0.65	101.1	42.93	95.8	2.65	4	0.3441	0.6881	2.78	1
LIS-S150	02-A	0-2	1.32	29.8	87.74	49.89	99.9	2.35	23.3	103	99.99	0.62									
LIS-S151	02-A	0-2	1.14	33.7																	
LIS-S152	02-A	0-2											15.2	93.25	50.8	0.808	4	9.799	19.6	9.93	1

Note: Many samples contained a high percentage of fines which caused delays in reaching a relative state of equilibrium and in turn the shear/consolidation calculations.

TABLE3 3
East River and Harlem River
Comparison Criteria Exceedances
Champlain Hudson Power Express

LOCATION			HAR-S120-01		HAR-S120-01		HAR-S121-03		HAR-S122-01		HAR-S123-01		HAR-S124-03	
SAMPLING DATE			5/3/2010		5/3/2010		5/3/2010		5/3/2010		5/3/2010		5/3/2010	
LAB SAMPLE ID			L1006751-01		L1006751-02		L1006751-03		L1006751-04		L1006751-05		L1006751-09	
SAMPLE TYPE/DEPTH			Composite 0-11'		Composite 11-15'		Composite 0-3'		Composite 0-3'		Composite 0-15'		Composite 0-13.5'	
ANALYTE	CAS #	Units	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
RIM Organochlorine Pesticides - Mansfield Lab														
4,4'-DDD	72-54-8	mg/kg	ND	0.00119	ND	0.00111	0.00571	0.00106	0.00203	0.00124	ND	0.00178	ND	0.00109
4,4'-DDE	72-55-9	mg/kg	ND	0.00119	ND	0.00111	ND	0.00106	ND	0.00124	ND	0.00178	ND	0.00109
4,4'-DDT	50-29-3	mg/kg	ND	0.00119	ND	0.00111	ND	0.00106	ND	0.00124	ND	0.00178	ND	0.00109
TOTAL DDD/E/T		mg/kg	ND	--	ND	--	0.00571	--	0.00203	--	ND	--	ND	--
Dieldrin	60-57-1	mg/kg	ND	0.00119	ND	0.00111	ND	0.00106	ND	0.00124	ND	0.00178	ND	0.00109
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab														
Acenaphthene	83-32-9	mg/kg	ND	0.0119	ND	0.0111	0.0161	0.0106	0.0718	0.0124	ND	0.0178	0.0731	0.0109
Acenaphthylene	208-96-8	mg/kg	ND	0.0119	ND	0.0111	0.337	0.0106	0.065	0.0124	ND	0.0178	ND	0.0109
Anthracene	120-12-7	mg/kg	ND	0.0119	ND	0.0111	0.114	0.0106	0.185	0.0124	ND	0.0178	0.034	0.0109
Benzo(a)anthracene	56-55-3	mg/kg	ND	0.0119	ND	0.0111	0.65	0.0106	0.578	0.0124	ND	0.0178	0.121	0.0109
Benzo(a)pyrene	50-32-8	mg/kg	ND	0.0119	ND	0.0111	0.823	0.0106	0.43	0.0124	ND	0.0178	0.0651	0.0109
Chrysene	218-01-9	mg/kg	ND	0.0119	ND	0.0111	1.11	0.0106	0.514	0.0124	ND	0.0178	0.103	0.0109
Dibenz(a,h)anthracene	53-70-3	mg/kg	ND	0.0119	ND	0.0111	0.203	0.0106	0.159	0.0124	ND	0.0178	0.0284	0.0109
Fluoranthene	206-44-0	mg/kg	ND	0.0119	ND	0.0111	2.68	0.0106	1.22	0.0124	ND	0.0178	0.69	0.0109
Fluorene	86-73-7	mg/kg	ND	0.0119	ND	0.0111	0.121	0.0106	0.0877	0.0124	ND	0.0178	ND	0.0109
Naphthalene	91-20-3	mg/kg	ND	0.0119	ND	0.0111	0.297	0.0106	0.195	0.0124	ND	0.0178	0.0327	0.0109
Phenanthrene	85-01-8	mg/kg	ND	0.0119	ND	0.0111	2.57	0.0106	0.722	0.0124	ND	0.0178	0.0382	0.0109
Pyrene	129-00-0	mg/kg	ND	0.0119	ND	0.0111	1.72	0.0106	0.982	0.0124	ND	0.0178	0.69	0.0109
TOTAL PAH		mg/kg	ND	--	ND	--	13.885	--	7.290	--	ND	--	2.478	--
TOTAL PCBs		mg/kg	ND	--	ND	--	0.0061	--	0.01202	--	ND	--	ND	--
PCB CALCULATION PER TOGS 5.1.9		mg/kg	ND	--	ND	--	0.0122	--	0.02404	--	ND	--	ND	--
Dioxin - Method 1613														
I-TEF-1988 TEQ (ND=0)	--	mg/kg	0.00E+00	--	0.00E+00	--	NA		1.12E-06	--	NA		9.80E-07	--
I-TEF-1988 TEQ (ND=1/2)	--	mg/kg	5.01E-06	--	5.01E-06	--	NA		5.77E-06	--	NA		5.88E-06	--
Total Metals - Mansfield Lab														
Arsenic, Total	7440-38-2	mg/kg	0.603	0.039	1.08	0.036	1.8	0.038	3.68	0.04	9.99	0.061	0.918	0.034
Cadmium, Total	7440-43-9	mg/kg	ND	0.039	0.067	0.036	ND	0.038	0.151	0.04	0.213	0.061	0.064	0.034
Copper, Total	7440-50-8	mg/kg	5.47	0.387	14.4	0.364	7.47	0.375	14.7	0.404	14.8	0.61	12.1	0.343
Lead, Total	7439-92-1	mg/kg	1.97	0.039	3.33	0.036	20.7	0.038	26.3	0.04	8.69	0.061	12.9	0.034
Mercury, Total	7439-97-6	mg/kg	ND	0.014	ND	0.012	0.035	0.013	0.155	0.016	ND	0.023	0.023	0.013
Nickel, Total	7440-02-0	mg/kg	6.62	0.077	15.2	0.073	4.46	0.075	5.38	0.081	23.8	0.122	8.9	0.069
Zinc, Total	7440-66-6	mg/kg	16.7	0.774	38.2	0.728	26.4	0.75	39.4	0.807	81	1.22	39.5	0.687

LOCATION			HAR-S125-03		EAS-S127-02		EAS-S127-02		EAS-S128-02		EAS-S129-01		Comparison Criteria				
SAMPLING DATE			5/3/2010		5/7/2010		5/7/2010		5/5/2010		5/5/2010		NOAA SQG		NYSDEC TOGS 5.1.9		
LAB SAMPLE ID			L1006751-08		L1006751-16		L1006751-17		L1006751-15		L1006751-14						
SAMPLE TYPE/DEPTH			Composite 0-11.8'		Composite 0-10.5'		Composite 10.5-15.5'		Composite 0-14.5'		Composite 0-15'						
ANALYTE	CAS #	Units	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	ER-L	ER-M	Class A	Class B	Class C
RIM Organochlorine Pesticides - Mansfield Lab																	
4,4'-DDD	72-54-8	mg/kg	0.063	0.00177	ND	0.00116	ND	0.00191	ND	0.00142	ND	0.0018	0.002	0.02	--	--	--
4,4'-DDE	72-55-9	mg/kg	0.0594	0.00177	ND	0.00116	ND	0.00191	ND	0.00142	ND	0.0018	0.002	0.015	--	--	--
4,4'-DDT	50-29-3	mg/kg	0.0203	0.00177	ND	0.00116	ND	0.00191	ND	0.00142	ND	0.0018	0.001	0.007	--	--	--
TOTAL DDD/E/T		mg/kg	0.14270	--	ND	--	ND	--	ND	--	ND	--	0.00158	0.0461	< 0.003	0.003 - 0.03	> 0.03
Dieldrin	60-57-1	mg/kg	0.0225	0.00177	ND	0.00116	ND	0.00191	ND	0.00142	ND	0.0018	0.00002	0.008	< 0.11	0.11 - 0.48	> 0.48
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab																	
Acenaphthene	83-32-9	mg/kg	48.4	0.707	0.148	0.0116	ND	0.0191	0.175	0.0142	ND	0.018	0.016	0.5	--	--	--
Acenaphthylene	208-96-8	mg/kg	5.77	0.707	0.227	0.0116	ND	0.0191	0.581	0.0142	0.0385	0.018	0.044	0.64	--	--	--
Anthracene	120-12-7	mg/kg	42.4	0.707	0.45	0.0116	ND	0.0191	0.946	0.0142	0.0199	0.018	0.0853	1.1	--	--	--
Benzo(a)anthracene	56-55-3	mg/kg	18.7	0.707	1.21	0.0116	ND	0.0191	2.47	0.0142	0.0682	0.018	0.261	1.6	--	--	--
Benzo(a)pyrene	50-32-8	mg/kg	14.7	0.707	0.983	0.0116	ND	0.0191	1.97	0.0142	0.0676	0.018	0.43	1.6	--	--	--
Chrysene	218-01-9	mg/kg	19.7	0.707	0.946	0.0116	ND	0.0191	1.92	0.0142	0.0542	0.018	0.384	2.8	--	--	--
Dibenz(a,h)anthracene	53-70-3	mg/kg	1.74	0.707	0.16	0.0116	ND	0.0191	0.268	0.0142	ND	0.018	0.0634	0.26	--	--	--
Fluoranthene	206-44-0	mg/kg	37.1	0.707	1.61	0.0116	ND	0.0191	2.88	0.0142	0.0895	0.018	0.6	5.1	--	--	--
Fluorene	86-73-7	mg/kg	22	0.707	0.0978	0.0116	ND	0.0191	0.129	0.0142	ND	0.018	0.019	0.54	--	--	--
Naphthalene	91-20-3	mg/kg	232	0.707	0.347	0.0116	ND	0.0191	0.13	0.0142	ND	0.018	0.16	2.1	--	--	--
Phenanthrene	85-01-8	mg/kg	76.3	0.707	0.434	0.0116	ND	0.0191	0.445	0.0142	0.0182	0.018	0.24	1.5	--	--	--
Pyrene	129-00-0	mg/kg	47.2	0.707	1.94	0.0116	ND	0.0191	3.87	0.0142	0.34	0.018	0.665	2.6	--	--	--
TOTAL PAH		mg/kg	614.360	--	10.679	--	ND	--	19.352	--	0.839	--	4.022	44.792	< 4	4 - 35	> 35
TOTAL PCBs		mg/kg	0.80	--	ND	--	ND	--	ND	--	ND	--	--	--	--	--	--
PCB CALCULATION PER TOGS 5.1.9		mg/kg	1.5962	--	ND	--	ND	--	ND	--	ND	--	--	--	< 0.1	0.1 - 1	> 1
Dioxin - Method 1613																	
I-TEF-1988 TEQ (ND=0)	--	mg/kg	NA		4.77E-08	--	2.26E-07	--	7.72E-07	--	8.64E-07	--	--	--	< 4.50E-06	4.50E-06 to 5.00E-05	> 5.00E-05
I-TEF-1988 TEQ (ND=1/2)	--	mg/kg	NA		5.05E-06	--	5.21E-06	--	5.70E-06	--	5.84E-06	--	--	--	< 4.50E-06	4.50E-06 to 5.00E-05	> 5.00E-05
Total Metals - Mansfield Lab																	
Arsenic, Total	7440-38-2	mg/kg	15.4	0.066	2.68	0.035	7.5	0.065	10.6	0.046	9.91	0.063	8.2	70	< 14	14 - 53	> 53
Cadmium, Total	7440-43-9	mg/kg	5.37	0.066	ND	0.035	0.17	0.065	0.208	0.046	0.149	0.063	1.2	9.6	< 1.2	1.2 - 9.5	> 9.5
Copper, Total	7440-50-8	mg/kg	251	0.66	2.36	0.354	15.5	0.65	20.7	0.462	13.6	0.625	34	270	< 33	33 - 207	> 207
Lead, Total	7439-92-1	mg/kg	336	0.066	2.16	0.035	9.58	0.065	22.5	0.046	9.79	0.063	43.7	218	< 33	33 - 166	> 166
Mercury, Total	7439-97-6	mg/kg	3.11	0.021	ND	0.013	ND	0.024	0.319	0.017	ND	0.022	0.15	0.71	< 0.17	0.17 - 1.6	> 1.6
Nickel, Total	7440-02-0	mg/kg	43.4	0.132	7.36	0.071	25.5	0.13	18.1	0.093	24	0.125	20.9	51.6	--	--	--
Zinc, Total	7440-66-6	mg/kg	551	1.32	22.1	0.708	87.4	1.3	76.1	0.925	79.5	1.25	150	410	--	--	--

Classifications:

0.159	Indicates value does not exceed ER-L or TOGS 5.1.9 Class A criteria
12.4	Indicates value exceeds ER-L value but below ER-M value
362	Indicates value exceeds ER-M value
0.159	Indicates value does not exceed ER-L or TOGS 5.1.9 Class A criteria
52	Indicates value is TOGS 5.1.9 Class B
2.08	Indicates value is TOGS 5.1.9 Class C

Underlined or underlined/bolded text in a TOGS 5.1.9 Class A, B, or C coded field indicates corresponding ER-L/ER-M exceedance.

RL - Reporting Limit

Qualifiers:

ND Laboratory Non-detect Value

-- No criteria given for standard

NA Constituent not analyzed for.

DPE Indicates the presence of a peak in the polychlorinated diphenylether channel that could cause a false positive or an overestimation of the affected analyte(s).

Q Indicates the presence of a quantitative interference. This situation may result in an underestimation of the affected analyte(s).

** For HAR-S122, HAR-S124, and EAS-S128, dioxin 2,3,7,8-TCDF was analyzed with the 17 dioxins and on it's own in a confirmation analysis. The greater of the two values is reported on this table. See Appendix B Parts II & III for complete lab data.

Criteria:

ER-L / ER-M Adapted From: National Oceanic and Atmospheric Administration. *Sediment Quality Guidelines Developed for the National Status and Trends Program* (June, 1999)

Class A, B, C Adapted From: New York State Department of Environmental Conservation Division of Water. *Technical & Operational Guidance Series (TOGS) 5.1.9 In-water and Riparian Management of Sediment and Dredged Material.* (November, 2004)

TABLE 4
Long Island Sound
Comparison Criteria Exceedances
Champlain Hudson Power Express

LOCATION / SAMPLING DATE / LAB SAMPLE ID / SAMPLE TYPE/DEPTH			LIS-S130-01 5/5/2010 L1006751-12 Composite 0-5'		BPH-S130-01 5/5/2010 L1006751-13 Composite 0-5'		LIS-S131-01 5/5/2010 L1006751-11 Composite 0-5'		LIS-S132-01 5/5/2010 L1006751-10 Composite 0-5'		LIS-S133-01-A 4/29/2010 L1006421-12 Composite 0-5'		LIS-S134-01-A 4/29/2010 L1006421-11 Composite 0-5'		BPH-S135-01-A 4/28/2010 L1006421-16 Composite 0-5'		LIS-S135-01-A 4/28/2010 L1006421-15 Composite 0-5'		LIS-S136-01-A 4/28/2010 L1006421-14 Composite 0-5'		LIS-S137-01-A 4/28/2010 L1006421-13 Composite 0-5'		LIS-S138-01-A 4/27/2010 L1006421-10 Composite 0-5'		Comparison Criteria: NOAA SQG		NYSDEC TOGS 5.1.9		
ANALYTE	CAS #	Units	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	ER-L	ER-M	Class A	Class B	Class C
RIM Organochlorine Pesticides - Mansfield Lab																													
4,4'-DDD	72-54-8	mg/kg	ND	0.00154	ND	0.00151	0.00346	0.00286	ND	0.00219	0.00811	0.00243	0.00446	0.00214	ND	0.0023	ND	0.00204	ND	0.00234	ND	0.00211	ND	0.00206	0.002	0.02	--	--	--
4,4'-DDE	72-55-9	mg/kg	0.00162	0.00154	ND	0.00151	0.00504	0.00286	ND	0.00219	0.0139	0.00243	0.00528	0.00214	ND	0.0023	ND	0.00204	ND	0.00234	ND	0.00211	ND	0.00206	0.002	0.015	--	--	--
4,4'-DDT	50-29-3	mg/kg	0.00203	0.00154	ND	0.00151	ND	0.00286	ND	0.00219	0.00358	0.00243	ND	0.00214	ND	0.0023	ND	0.00204	ND	0.00234	ND	0.00211	ND	0.00206	0.001	0.007	--	--	--
TOTAL DDD/E/T		mg/kg	0.00365	--	ND	--	0.0085	--	ND	--	0.02559	--	0.00974	--	ND	--	ND	--	ND	--	ND	--	ND	--	0.00158	0.0461	< 0.003	0.003 - 0.03	> 0.03
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab																													
Acenaphthene	83-32-9	mg/kg	0.122	0.0154	0.0941	0.0151	0.0517	0.0286	0.0584	0.0219	0.0475	0.0192	ND	0.0176	ND	0.0178	ND	0.0156	ND	0.0183	ND	0.016	ND	0.0171	0.016	0.5	--	--	--
Acenaphthylene	208-96-8	mg/kg	**1.06**	0.0154	**1**	0.0151	0.271	0.0286	0.0974	0.0219	0.151	0.0192	0.0537	0.0176	ND	0.0178	0.0218	0.0156	0.0385	0.0183	ND	0.016	0.043	0.0171	0.044	0.64	--	--	--
Anthracene	120-12-7	mg/kg	0.831	0.0154	0.669	0.0151	0.227	0.0286	0.148	0.0219	0.138	0.0192	0.0401	0.0176	ND	0.0178	ND	0.0156	0.0245	0.0183	ND	0.016	0.0297	0.0171	0.0853	1.1	--	--	--
Benzo(a)anthracene	56-55-3	mg/kg	**3.75**	0.0154	**2.9**	0.0151	0.603	0.0286	0.448	0.0219	0.399	0.0192	0.125	0.0176	0.0428	0.0178	0.0545	0.0156	0.0942	0.0183	0.0261	0.016	0.0876	0.0171	0.261	1.6	--	--	--
Benzo(a)pyrene	50-32-8	mg/kg	**3.61**	0.0154	**2.83**	0.0151	0.673	0.0286	0.449	0.0219	0.412	0.0192	0.153	0.0176	0.0469	0.0178	0.0608	0.0156	0.11	0.0183	0.0272	0.016	0.112	0.0171	0.43	1.6	--	--	--
Chrysene	218-01-9	mg/kg	2.68	0.0154	2.2	0.0151	0.538	0.0286	0.393	0.0219	0.365	0.0192	0.125	0.0176	0.0417	0.0178	0.0513	0.0156	0.0898	0.0183	0.026	0.016	0.0916	0.0171	0.384	2.8	--	--	--
Dibenz(a,h)anthracene	53-70-3	mg/kg	**0.529**	0.0154	**0.42**	0.0151	0.131	0.0286	0.0998	0.0219	0.0986	0.0192	0.0393	0.0176	ND	0.0178	ND	0.0156	0.0276	0.0183	ND	0.016	0.0267	0.0171	0.0634	0.26	--	--	--
Fluoranthene	206-44-0	mg/kg	3.59	0.0154	2.47	0.0151	0.792	0.0286	0.717	0.0219	0.704	0.0192	0.21	0.0176	0.0647	0.0178	0.077	0.0156	0.154	0.0183	0.0416	0.016	0.144	0.0171	0.6	5.1	--	--	--
Fluorene	86-73-7	mg/kg	0.269	0.0154	0.203	0.0151	0.0778	0.0286	0.0635	0.0219	0.0794	0.0192	ND	0.0176	ND	0.0178	ND	0.0156	ND	0.0183	ND	0.016	ND	0.0171	0.019	0.54	--	--	--
Naphthalene	91-20-3	mg/kg	0.161	0.0154	0.153	0.0151	0.0734	0.0286	0.0547	0.0219	0.167	0.0192	0.0345	0.0176	ND	0.0178	ND	0.0156	0.0231	0.0183	ND	0.016	0.023	0.0171	0.16	2.1	--	--	--
Phenanthrene	85-01-8	mg/kg	1.14	0.0154	0.686	0.0151	0.428	0.0286	0.412	0.0219	0.32	0.0192	0.0878	0.0176	0.0287	0.0178	0.0307	0.0156	0.0635	0.0183	0.0172	0.016	0.0572	0.0171	0.24	1.5	--	--	--
Pyrene	129-00-0	mg/kg	**5.46**	0.0154	**4.12**	0.0151	0.909	0.0286	0.728	0.0219	0.755	0.0192	0.274	0.0176	0.0889	0.0178	0.109	0.0156	0.198	0.0183	0.0539	0.016	0.173	0.0171	0.665	2.6	--	--	--
TOTAL PAH		mg/kg	30.242	--	23.1451	--	6.5689	--	5.0668	--	5.0305	--	1.7024	--	0.4962	--	0.6252	--	1.2296	--	0.301	--	1.1987	--	4.022	44.792	< 4	4 - 35	> 35
TOTAL PCBs		mg/kg	0.00924	--	0.00781	--	0.03998	--	ND	--	0.1007	--	0.03736	--	ND	--	0.00423	--	ND	--	ND	--	0.00196	--	--	--	--	--	--
PCB CALCULATION PER TOGS 5.1.9		mg/kg	0.01848	--	0.01562	--	0.07996	--	ND	--	0.2014	--	0.07472	--	ND	--	0.00846	--	ND	--	ND	--	0.00392	--	--	--	< 0.1	0.1 - 1	> 1
Total Metals - Mansfield Lab																													
Arsenic, Total	7440-38-2	mg/kg	11.2	0.049	10.9	0.055	12.2	0.1	10.7	0.078	11.9	0.077	10.5	0.071	10.1	0.076	10.3	0.066	9.91	0.077	11	0.064	10.1	0.067	8.2	70	< 14	14 - 53	> 53
Cadmium, Total	7440-43-9	mg/kg	0.43	0.049	0.403	0.055	1.43	0.1	0.525	0.078	2.07	0.077	0.946	0.071	0.352	0.076	0.373	0.066	0.321	0.077	0.203	0.064	0.353	0.067	1.2	9.6	< 1.2	1.2 - 9.5	> 9.5
Chromium, Total	7440-47-3	mg/kg	35.5	0.195	35.4	0.219	87.1	0.402	47	0.31	115	0.306	73.5	0.286	54	0.303	55.8	0.264	60	0.306	48.5	0.257	61.2	0.267	81	370	--	--	--
Copper, Total	7440-50-8	mg/kg	62.4	0.488	64.1	0.55	131	1.01	71.4	0.775	171	0.153	83.2	0.143	36.7	0.151	39.1	0.132	53.5	0.153	28	0.128	61.1	0.133	34	270	< 33	33 - 207	> 207
Iron, Total	7439-89-6	mg/kg	21100	195	21100	219	35000	402	31600	310	35800	306	34500	286	34900	303	36000	264	35400	306	34800	257	34000	267	--	--	--	--	--
Lead, Total	7439-92-1	mg/kg	57.5	0.049	61.5	0.055	83.4	0.1	51.6	0.078	92.7	0.077	44	0.071	20.9	0.076	21.8	0.066	28.6	0.077	14.7	0.064	27.7	0.067	43.7	218	< 33	33 - 166	> 166
Mercury, Total	7439-97-6	mg/kg	0.678	0.021	0.676	0.019	0.68	0.034	0.54	0.025	**0.758**	0.031	0.341	0.029	0.102	0.029	0.114	0.026	0.211	0.028	0.051	0.025	0.222	0.028	0.15	0.71	< 0.17	0.17 - 1.6	> 1.6
Nickel, Total	7440-02-0	mg/kg	18.4	0.098	18.3	0.11	32	0.201	25.7	0.155	35.4	0.153	30.1	0.143	28.2	0.151	28.2	0.132	28.5	0.153	26.9	0.128	28	0.133	20.9	51.6	--	--	--
Zinc, Total	7440-66-6	mg/kg	136	0.977	133	1.1	282	2.01	195	1.55	356	1.53	203	1.43	131	1.51	136	1.32	161	1.53	112	1.28	165	1.33	150	410	--	--	--

LOCATION / SAMPLING DATE / LAB SAMPLE ID / SAMPLE TYPE/DEPTH			LIS-S140-01-A 4/27/2010 L1006421-09 Composite 0-5'		LIS-S142-02-A 4/26/2010 L1006421-01 Composite 0-5'		BPH-S144-01-A 4/26/2010 L1006421-02 Composite 0-5'		LIS-S144-01-A 4/26/2010 L1006421-05 Composite 0-5'		LIS-S146-01-A 4/26/2010 L1006421-04 Composite 0-5'		LIS-S148-01-A 4/26/2010 L1006421-03 Composite 0-5'		LIS-S150-01-A 4/25/2010 L1006421-08 Composite 0-5'		LIS-S151-01-A 4/25/2010 L1006421-07 Composite 0-5'		LIS-S152-01-A 4/25/2010 L1006421-06 Composite 0-5'		Comparison Criteria: NOAA SQG		NYSDEC TOGS 5.1.9		
ANALYTE	CAS #	Units	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	ER-L	ER-M	Class A	Class B	Class C
RIM Organochlorine Pesticides - Mansfield Lab																									
4,4'-DDD	72-54-8	mg/kg	ND	0.00187	ND	0.00186	ND	0.00162	ND	0.00149	ND	0.00114	ND	0.00176	0.00408	0.00187	ND	0.00135	ND	0.00107	0.002	0.02	--	--	--
4,4'-DDE	72-55-9	mg/kg	ND	0.00187	ND	0.00186	ND	0.00162	ND	0.00149	ND	0.00114	ND	0.00176	ND	0.00187	ND	0.00135	ND	0.00107	0.002	0.015	--	--	--
4,4'-DDT	50-29-3	mg/kg	ND	0.00187	ND	0.00186	ND	0.00162	ND	0.00149	ND	0.00114	ND	0.00176	ND	0.00187	ND	0.00135	ND	0.00107	0.001	0.007	--	--	--
TOTAL DDD/E/T		mg/kg	ND	--	ND	--	ND	--	ND	--	ND	--	ND	--	0.00408	--	ND	--	ND	--	0.00158	0.0461	< 0.003	0.003 - 0.03	> 0.03
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab																									
Acenaphthene	83-32-9	mg/kg	0.0922	0.015	ND	0.0144	ND	0.0123	ND	0.012	ND	0.00892	ND	0.0141	ND	0.0141	ND	0.0104	ND	0.00867	0.016	0.5	--	--	--
Acenaphthylene	208-96-8	mg/kg	0.137	0.015	0.0259	0.0144	0.0363	0.0123	0.0342	0.012	ND	0.00892	0.0252	0.0141	0.126	0.0141	ND	0.0104	ND	0.00867	0.044	0.64	--	--	--
Anthracene	120-12-7	mg/kg	0.133	0.015	ND	0.0144	0.0206	0.0123	0.0189	0.012	ND	0.00892	0.0154	0.0141	0.081	0.0141	ND	0.0104	ND	0.00867	0.0853	1.1	--	--	--
Benz(a)anthracene	56-55-3	mg/kg	0.455	0.015	0.0682	0.0144	0.0742	0.0123	0.0772	0.012	ND	0.00892	0.0598	0.0141	0.462	0.0141	0.0186	0.0104	ND	0.00867	0.261	1.6	--	--	--
Benzo(a)pyrene	50-32-8	mg/kg	0.373	0.015	0.0713	0.0144	0.0876	0.0123	0.0917	0.012	ND	0.00892	0.0693	0.0141	0.486	0.0141	0.0183	0.0104	ND	0.00867	0.43	1.6	--	--	--
Chrysene	218-01-9	mg/kg	0.368	0.015	0.0535	0.0144	0.0651	0.0123	0.0722	0.012	ND	0.00892	0.0534	0.0141	0.402	0.0141	0.0151	0.0104	ND	0.00867	0.384	2.8	--	--	--
Dibenz(a,h)anthracene	53-70-3	mg/kg	0.081	0.015	0.016	0.0144	0.0209	0.0123	0.0209	0.012	ND	0.00892	0.0173	0.0141	0.106	0.0141	ND	0.0104	ND	0.00867	0.0634	0.26	--	--	--
Fluoranthene	206-44-0	mg/kg	0.695	0.015	0.0904	0.0144	0.108	0.0123	0.108	0.012	ND	0.00892	0.0885	0.0141	0.728	0.0141	0.0221	0.0104	ND	0.00867	0.6	5.1	--	--	--
Fluorene	86-73-7	mg/kg	0.0621	0.015	ND	0.0144	ND	0.0123	ND	0.012	ND	0.00892	ND	0.0141	0.0351	0.0141	ND	0.0104	ND	0.00867	0.019	0.54	--	--	--
Naphthalene	91-20-3	mg/kg	0.107	0.015	ND	0.0144	0.0141	0.0123	0.0132	0.012	ND	0.00892	ND	0.0141	0.0634	0.0141	ND	0.0104	ND	0.00867	0.16	2.1	--	--	--
Phenanthrene	85-01-8	mg/kg	0.283	0.015	0.0432	0.0144	0.06	0.0123	0.0581	0.012	ND	0.00892	0.052	0.0141	0.239	0.0141	0.0118	0.0104	ND	0.00867	0.24	1.5	--	--	--
Pyrene	129-00-0	mg/kg	0.734	0.015	0.128	0.0144	0.153	0.0123	0.14	0.012	ND	0.00892	0.119	0.0141	1.13	0.0141	0.033	0.0104	ND	0.00867	0.665	2.6	--	--	--
TOTAL PAH		mg/kg	4.6743	--	0.7399	--	0.9509	--	0.9453	--	ND	--	0.7606	--	5.3885	--	0.1896	--	ND	--	4.022	44.792	< 4	4 - 35	> 35
TOTAL PCBs		mg/kg	0.01008	--	ND	--	ND	--	ND	--	ND	--	ND	--	ND	--	ND	--	ND	--	--	--	--	--	--
PCB CALCULATION PER TOGS 5.1.9		mg/kg	0.02016	--	ND	--	ND	--	ND	--	ND	--	ND	--	ND	--	ND	--	ND	--	--	--	< 0.1	0.1 - 1	> 1
Total Metals - Mansfield Lab																									
Arsenic, Total	7440-38-2	mg/kg	9.03	0.063	17.8	0.062	8.15	0.054	7.86	0.054	1.29	0.037	9.34	0.063	8.37	0.06	6.37	0.041	0.966	0.034	8.2	70	< 14	14 - 53	> 53
Cadmium, Total	7440-43-9	mg/kg	0.6	0.063	0.277	0.062	0.202	0.054	0.176	0.054	ND	0.037	0.163	0.063	0.809	0.06	0.151	0.041	0.077	0.034	1.2	9.6	< 1.2	1.2 - 9.5	> 9.5
Chromium, Total	7440-47-3	mg/kg	67.5	0.25	48.9	0.248	50.4	0.215	48.4	0.214	9.41	0.148	53.4	0.253	58.2	0.239	23.6	0.163	6.09	0.136	81	370	--	--	--
Copper, Total	7440-50-8	mg/kg	112	0.125	37.8	0.124	60	0.108	56.6	0.107	7.72	0.074	52	0.127	162	0.12	20.3	0.082	6.19	0.068	34	270	< 33	33 - 207	> 207
Iron, Total	7439-89-6	mg/kg	28400	250	31200	248	22600	215	22200	214	7300	148	29300	253	27300	239	18700	163	4560	136	--	--	--	--	--
Lead, Total	7439-92-1	mg/kg	35.7	0.063	17.4	0.062	16.5	0.054	15.8	0.054	1.98	0.037	18.5	0.063	40.9	0.06	6.32	0.041	1.86	0.034	43.7	218	< 33	33 - 166	> 166
Mercury, Total	7439-97-6	mg/kg	0.457	0.023	0.15	0.024	0.129	0.02	0.135	0.02	ND	0.015	0.118	0.022	2.08	0.024	0.036	0.015	ND	0.014	0.15	0.71	< 0.17	0.17 - 1.6	> 1.6
Nickel, Total	7440-02-0	mg/kg	27.3	0.125	25	0.124	18.5	0.108	17.9	0.107	7.19	0.074	23.9	0.127	23.5	0.12	13.8	0.082	3.72	0.068	20.9	51.6	--	--	--
Zinc, Total	7440-66-6	mg/kg	224	1.25	124	1.24	118	1.08	110	1.07	20.7	0.74	126	1.27	198	1.2	56.8	0.816	17.7	0.681	150	410	--	--	--

0.159	Indicates value does not exceed ER-L or TOGS 5.1.9 Class A criteria
12.4	Indicates value exceeds ER-L value but below ER-M value
362	Indicates value exceeds ER-M value
0.159	Indicates value does not exceed ER-L or TOGS 5.1.9 Class A criteria
52	Indicates value is TOGS 5.1.9 Class B
2.08	Indicates value is TOGS 5.1.9 Class C

Underlined or underlined/bolded text in a TOGS 5.1.9 Class A, B, or C coded field indicates corresponding ER-L/ER-M exceedance.

RL - Reporting Limit

Qualifiers:

ND Laboratory Non-detect Value

-- No criteria given for standard

Criteria:

ER-L / ER-M Adapted From: National Oceanic and Atmospheric Administration. *Sediment Quality Guidelines Developed for the National Status and Trends Program.* (June, 1999)

Class A, B, C Adapted From: New York State Department of Environmental Conservation Division of Water. *Technical & Operational Guidance Series (TOGS) 5.1.9 In-water and Riparian Management of Sediment and Dredged Material.* (November, 2004)

SEDIMENT SURVEY: HARLEM RIVER, EAST RIVER AND LONG ISLAND SOUND

LIST OF ATTACHMENTS (on CD)

Attachment 1 Marine Route Survey Sediment Core Locations

Attachment 2: Core Logs

Attachment 3: Photo Log

Attachment 4: Chemical Analysis Data Tables

Attachment 5: Geotechnical Laboratory Results

Champlain Hudson Power Express Project

Attachment E: Marine Route Survey
Appendix B Part III

Benthic Survey Technical Report
Harlem River
East River
Long Island Sound

July 2010

TABLE OF CONTENTS

SECTION NO. **PAGE NO.**

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

1.0 INTRODUCTION

CHPEI proposes to develop the Champlain Hudson Power Express Project (Project) to connect renewable sources of power generation in central and eastern Canada and upstate New York to load centers in and around the New York City and southwestern Connecticut regions. The Project will include underwater and underground, high-voltage direct current (HVDC) transmission cables connecting HVDC converter stations in Canada with HVDC converter stations in Yonkers, New York and Bridgeport, Connecticut. The Project consists of a 2,000 megawatt (MW) HVDC underwater/underground HVDC transmission system that includes two 1,000 MW bipoles (each bipole includes two cables connected as a bipole pair), one extending between the Canadian border and New York City, New York and the other extending between the Canadian border and Bridgeport, Connecticut. CHPEI has designed the Project to meet the New York City area's need for additional sources of competitively priced electricity from safe and reliable renewable sources of energy.

The proposed transmission cable route corridor was developed to avoid and minimize potential environmental impacts and along favorable conditions for the installation of the cable. The selection of the proposed cable corridor and route took into consideration water depths, sea floor geology, contaminated sediments, fishing activities, restricted areas, environmentally sensitive areas, cultural resources and physical obstacles. In order to further refine the underwater transmission cable route, a Marine Route Survey was conducted during Spring 2010. The Marine Route Survey included geophysical, sediment and benthic surveys.

In March 2010, CHPEI filed an Article VII application with the New York State Public Service Commission. The data from the Spring 2010 Marine Route Survey is summarized in the following report and attachments. The results of the benthic survey are being used to supplement the data discussed in Sections 4.7 of the March 2010 Article VII application and to assist in assessing the potential impacts associated with the installation of the underwater transmission cable. The following sections discuss the results of the benthic survey conducted in the Harlem River, East River and Long Island Sound.

2.0 METHODS

2.1 Sampling Effort

In May of 2010, benthic samples were collected along the proposed cable route in the Harlem River, East River, and western Long Island Sound. Four samples were attempted in the Harlem River, at least seven in the East River, and thirteen in the Long Island Sound. Sample locations were distributed based on sediment type and previously existing information on the benthic communities of these waterbodies (Figure 1).

Benthic samples were collected using a 0.1 m2 Van Veen Grab. At each sampling location, the Van Veen Grab was lowered vertically until contact was made with the bottom. The Van Veen Grab was then raised slowly to minimize sample disturbance. Once the sample was secured onboard, the grab was examined for acceptability (i.e., undisturbed surface sediment, no signs of leakage, and penetration depth of at least 5 cm) and redeployed if unacceptable. Valid samples were washed through a 500 µm mesh sieve. The material retained within the sieve was placed into a labeled 2 liter sample bottle and preserved with 10% buffered formalin containing Rose Bengal stain for laboratory analysis. If the target location for the sample could not be sampled due to obstructions and/or bottom type, the sample location was moved up to 100 feet along the cable route (either "upstream" or "downstream").

In the laboratory, organisms were sorted from the remaining debris, identified and enumerated. Identifications were made to the lowest practical identification level when not to the species level. When the number of organisms in a sample was large (>500) subsampling was conducted using a sampling tray with 30 grids, each 6 cm x 6 cm. Organisms in randomly selected grids were counted until the total number of organisms removed and sorted was >100. Selected squares were sorted in their entirety, even after the 100-organism count was reached.

Quality Assurance / Quality Control (QA/QC) for sorting used a continuous sampling plan (CSP-1) that requires that each batch of samples pass the required level of QC before continuing the analysis of the next batch. This plan requires that the first eight samples that are analyzed by the laboratory be resorted and meet a 90% accuracy level before continuing the sorting of subsequent samples. After this criterion is met, one randomly selected sample out of the next seven samples will be resorted to determine if the 90% accuracy level has been attained. As long as this criterion is met, one random sample out of every seven will be checked for the remainder of the program. If there is a failure, the next eight samples are resorted to reestablish a 90% accuracy level. Quality control of the identification phase of the analysis will be done by individual taxonomist, and will follow the CSP-1 format outlined above for sorting.

2.2 Data Analysis

The benthic community was assessed through calculation of density, taxa richness, Shannon-Wiener's diversity index, and evenness from the benthic grab data. To assess the community of each sampling area as a whole (e.g., Harlem River), biodiversity indices were calculated from the summary of all samples in that area.

Benthic density, or abundance, can be used as an indicator of benthic community health. Density, the number of organisms per meter squared (organisms/m^2), was calculated for each taxa in each sample collected, the sum of which was the organism density for the sample. Density was also calculated for each area as a whole (e.g., Harlem River) by taking the average of each taxa collected at each station in that area. Density was based on the total grab area sampled (0.1m2) and the applicable laboratory split fraction, if the sample was subsampled.

Taxa richness is a measure of the total number of unique taxa collected at a site. In counting the number of taxa present, taxonomic designations at the generic, familial, and higher taxonomic levels were dropped if there was one valid lower level designation for that group. For example, if *Leitoscoloplos sp.*, *Leitoscoloplos fragilis*, and *Leitoscoloplos robustus* were all identified in one sample, then *Leitoscoloplos sp.* was skipped when counting the number of taxa. The number of taxa recorded in this example would be two. Taxa richness was calculated in this matter in order to be conservative with the number of species present.

The Shannon-Wiener Diversity Index (H') is a widely used species diversity index. It provides more information about the benthic community structure than taxa richness because it takes into account the relative abundance of each taxa as well as taxa richness. Comparing between samples, lower values of H′ indicate lower taxa richness and an uneven distribution of abundance among species while higher values indicate higher taxa richness and an even distribution of abundance among taxa. Typically, a healthy benthic macroinvertebrate community would have a relatively high H′ value. The index is computed as follows:

$$H' = -\sum_{i=1}^{s} (p_i Lnp_i)$$

S is the total number of species per sample (i.e., taxa richness) and pi is the proportion of total individuals in the ith species. Mathematically, pi is defined as ni/N where ni is the number of individuals of a taxa in a sample and N is the total number of individuals of all taxa in the sample.

The Evenness (E) measures the distribution among species within the community by scaling one of the diversity measures relative to its maximal possible value. Evenness can range from 0 to 1. It is computed as follows:

$$E = \frac{H'}{H'_{\max}}$$

where H' is the observed diversity (as cited above) and H'max is the natural logarithm of the total number of taxa (S) in the sample (H'max= LnS).

The proportions of benthic organisms characterized as pollution tolerant (i.e., indicators of potentially degraded habitat conditions) and pollution sensitive (indicators of quality habitat) in grab samples were also calculated based on Adams 1998, Llansó et al. 2002, and Weis 1995. Pollution tolerant taxa include: Oligochaeta, *Leitoscoloplos fragilis*, Capitellidae, *Streblospio benedicti*, and *Mulinia lateralis*. Pollution sensitive taxa include: *Chaetopterus variopedatus*, *Spiophanes bombyx*, *Cyathura polita*, *Anadara transversa*, *Mercenaria mercenaria*, and *Acteocina canaliculata*.

3.0 RESULTS

3.1 Harlem River

A total of three benthic samples were collected in the Harlem River, samples B-95 through B-97. Station B-94, located at the mouth of the Harlem River was unable to be collected due to rocky bottom substrates. Station 95, located near Sherman Creek, contained only 5 taxa and had a density of 350 individuals/m2 (Table 1). Taxa were distributed among annelids (3) and arthropods (2) (Table 2). Diversity and evenness were low (0.69 and 0.43, respectively), and the sample was dominated by the polychaete *Scolecolepides viridis*, comprising 280 individuals/m^2. The next most abundant taxa, Capitellidae (30 individuals/m^2) are considered a pollution tolerant family. No pollution sensitive taxa were collected, but pollution tolerant species comprised 12% of the benthic assemblage at this location.

Station B-96, located just south of Interstate 95 had a similar reduced benthic community only containing three taxa and 140 individuals/m^2. The sample was comprised mostly of *Scolecolepides viridis*, but also contained the pollution tolerant family Capitellidae (29% of total sample) and *Corophium sp*. Diversity and evenness were 0.83 and 0.76, respectively (Table 3). None of the taxa collected were pollution sensitive.

Sample B-97, located near the East River, was comprised of 14 unique taxa and had a total density of 45,305 individuals/m^2 (Table 1). Taxa were distributed among annelids (9), arthropods (2), and other (3) including Actinaria, *Molgula manhattensis*, and Nematoda (Table 2). Diversity and evenness were still fairly low (1.46 and 0.55 respectively), mostly due to the large collection of the pollution tolerant species *Streblospio benedicti* (29,253 individuals/m^2). This station, was dominated by pollution tolerant species (72% of assemblage), and consisted of a few pollution sensitive individuals (3%).

Overall, the benthic community in the Harlem River is highly degraded. The three samples which were successfully collected indicated that the majority of the river, away from the mouth from the East River, has limited species occurring at low densities. Diversity and evenness for the Harlem River was relatively low (1.47 and 0.53, respectively). The dominant organisms were Capitellidae and *Streblospio benedicti.* These polychaetes are pollution tolerant and typically colonize an area quickly.

3.2 East River

Four samples were collected in the East River, two in the vicinity of the proposed Polletti landfall approach (B-99A and B-99B), one located near North Brother Island (B-101) and one near College Point, Queens (B-102). Three additional samples were attempted along the proposed route, and multiple were attempted near the Polletti landfall, but the substrate at those locations resulted in invalid grabs.

Sample B-101 consisted of 21 unique taxa and a total of 8,625 individuals/m^2 (Table 1). Taxa were distributed among annelids (10), arthropods (7), mollusks (3) and one Cnidarian (Actiniaria) (Table 2). Diversity and evenness indices were relatively high (2.03 and 0.67, respectively) compared to the Harlem River samples. The sample was dominated by the polychaete family Cirratulidae (2,851 individuals/m^2) and the amphipod family Aoridae (2,288 individuals/m2). Pollution tolerant taxa comprised 7% of the assemblage, while pollution sensitive species comprised 2% (Table 3).

Sample B-102 contained 16 species and 38,880 individuals/m2 (Table 1). Taxa consisted of annelids (10), arthropods (5), and 1 mollusk (*Mytilus edulis*). Similar to sample B-101, the majority of the individuals collected were Cirratulidae (23,700 individuals/m^2). The next most abundant species was the polychaete *Sabellaria vulgaris* (8,400 individuals/m^2). Diversity (1.29) and evenness (0.47) were slightly less than sample B-101, mostly due to Cirratulidae dominating the assemblage. Pollution tolerant taxa comprised 4% of the assemblage, and no pollution sensitive taxa were collected.

The two samples collected along the proposed Polletti landfall route were collected immediately adjacent to each other. This was due to the existing hard bottom substrate in the majority of the area. Both of these samples indicated a highly impacted community, with stations B-99A and B-99B being composed nearly entirely of pollution tolerant taxa (83% and 94%, respectively), and a complete absence of pollution sensitive taxa. Seven (7) unique taxa were collected in each sample, and densities between samples were comparable (3,623 individuals/m^2 in sample B-99A, 3,514 individuals/m^2 in B-99B). The pollution tolerant taxa *Lietoscolopus fragilis* dominated both samples, accounting for 61% and 65% of the total catch, respectively.

With the exception samples near the proposed Polletti landfall, the benthic community appears to be a healthier community than that of the Harlem River, with less pollution tolerant species, and higher taxa richness and diversity. Diversity for the area as a whole was 1.87, and evenness was 0.55. A total of 29 unique taxa were collected in the four successful samples with an average sample density of 13,641 individuals/m^2. The two samples taken near the Polletti landfall indicate that the benthic habitat in that area is highly degraded.

3.3 Long Island Sound

A total of 12 benthic samples were collected in New York waters of western Long Island Sound. These 12 samples, B-103 through B-114, consisted of 33 unique taxa. Taxa richness ranged from 3 unique taxa in sample B-108, to 17 taxa in sample B-103. The average taxa richness of all stations was 8.8 taxa. Densities ranged across samples, from 680 individuals/m^2 in sample B-106, to 31,740 individuals/m^2 in sample B-113. The average density was 8,180 individuals/m^2 (Table 1).

As with taxa richness and density, diversity and evenness ranged among samples and did not appear to follow any spatial trend. Diversity ranged from 0.93 to 2.06 (Samples B-108 and B-103, respectively). Diversity of this portion of the Sound was calculated to be 1.68, indicating greater diversity than the Harlem and East Rivers (Table 3). Evenness ranged from 0.46 (B-113) to 0.85 (B-108). Evenness of the benthic community in this portion of the Sound was 0.48.

Mollusks dominated all samples, with the exception of sample B-103, comprising between 62% and 95% of the total individuals collected in each sample (Table 2). Station B-103 consisted of arthropods (53%) and annelids (42%). The high concentrations of mollusks among the 12 samples can be attributed to high densities of the pollution tolerant species *Mulinia lateralis*, the dwarf surf clam, and *Nucula proxima*, the Atlantic nutclam. *Mulinia lateralis* was collected at densities up to 5,400 individuals/m^2 (B-105), and *Nucula proxima* was collected at densities up to 2,853 individuals/m^2. From sample B-108 through sample B-114, arthropods were absent from the benthic assemblage, with the exception of *Ampelisca abdita* being collected in sample B-110 (50 individuals/m^2).

Pollution tolerant species dominated samples in western Long Island Sound, accounting for 45% of all individuals collected. Sample B-108 lacked any pollution tolerant species while B-111 and B-106 consisted of 2% and 3% pollution tolerant species, respectively. This large percentage of pollution tolerant species can be attributed to the high densities of *Mulinia lateralis*, except sample B-103, which was due to large densities of Capitellidae. Pollution sensitive species were nearly absent from all samples, with the exception of sample B-106, which contained *Acteocina canaliculata* (10% of assemblage).

4.0 SUMMARY

The benthic macroinvertebrate community collected during the spring 2010 Marine Route Survey of the Harlem River, East River and Long Island Sound was typical of the existing benthic communities in an urbanized estuary. The Harlem River, East River, and western Long Island Sound all showed differing levels of degradation in the benthic community. The Harlem River was dominated by the polychaetes, *Scolecolepides viridis*, Capitelledae, and *Streblospio benedictii*. Annelids and arthropods composed the majority of the East River samples, with pollution tolerant taxa dominating the samples obtained near the Polletti landfall. Twenty nine taxa were found in the East River compared to 16 in the Harlem River.

Benthic samples from the New York waters of western Long Island Sound collected during May 2010 were dominated by mollusks while arthropods were nearly absent. Thirty three (33) species were identified in the 12 samples, but the dominance of the pollution tolerant dwarf surf clam at almost all stations may be evidence that this area of the Sound is degraded. Western Long Island Sound has been documented to have low dissolved oxygen condition in the bottom waters resulting from wastewater treatment plant discharges and non-point source effluents from the watershed. The lack of arthropods, a common marine inshore group of invertebrates, may be related to the poor water quality conditions.

Because urbanized estuaries (i.e., Harlem River, East River and western Long Island Sound) are naturally subject to shifting gradients in salinity, temperature, turbidity and nutrients and are also affected by human-induced events, such as heavy vessel traffic and increased pollutant loading, the benthic organisms that inhabit urbanized estuaries are generally fairly tolerant of changes in these parameters. Furthermore, the types of organisms that are common to disturbed environments are usually opportunistic species that can quickly repopulate a habitat following a disturbance through either migration or reproduction.

5.0 LITERATURE CITED

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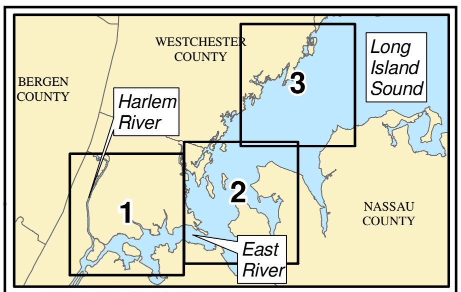
Weiss, H. M. 1995. Marine animals of southern New England and New York: Identification keys to common nearshore and shallow water macrofauna. State Geological and Natural History Survey of Connecticut. Department of Environmental Protection Maps and Publications Office. Hartford, CT.



DISTRIBUTION OF BENTHIC TAXA

% ANNELIDA
% ARTHROPODA
% MOLLUSCA
% OTHER

Proposed Underwater Cable Route

Champlain Hudson Power Express Project

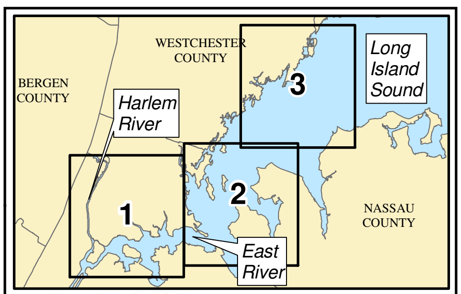
Benthic Community Indices for Grab Locations B-95 to B-113 Harlem and East Rivers, Long Island Sound

SOURCES: ESRI, TDI, TRC

0 2,000 4,000 Feet

Figure 1

Sheet 1 of 3



Transmission Developers Inc.

HDR

DISTRIBUTION OF BENTHIC TAXA

% ANNELIDA
% ARTHROPODA
% MOLLUSCA
% OTHER

Proposed Underwater Cable Route

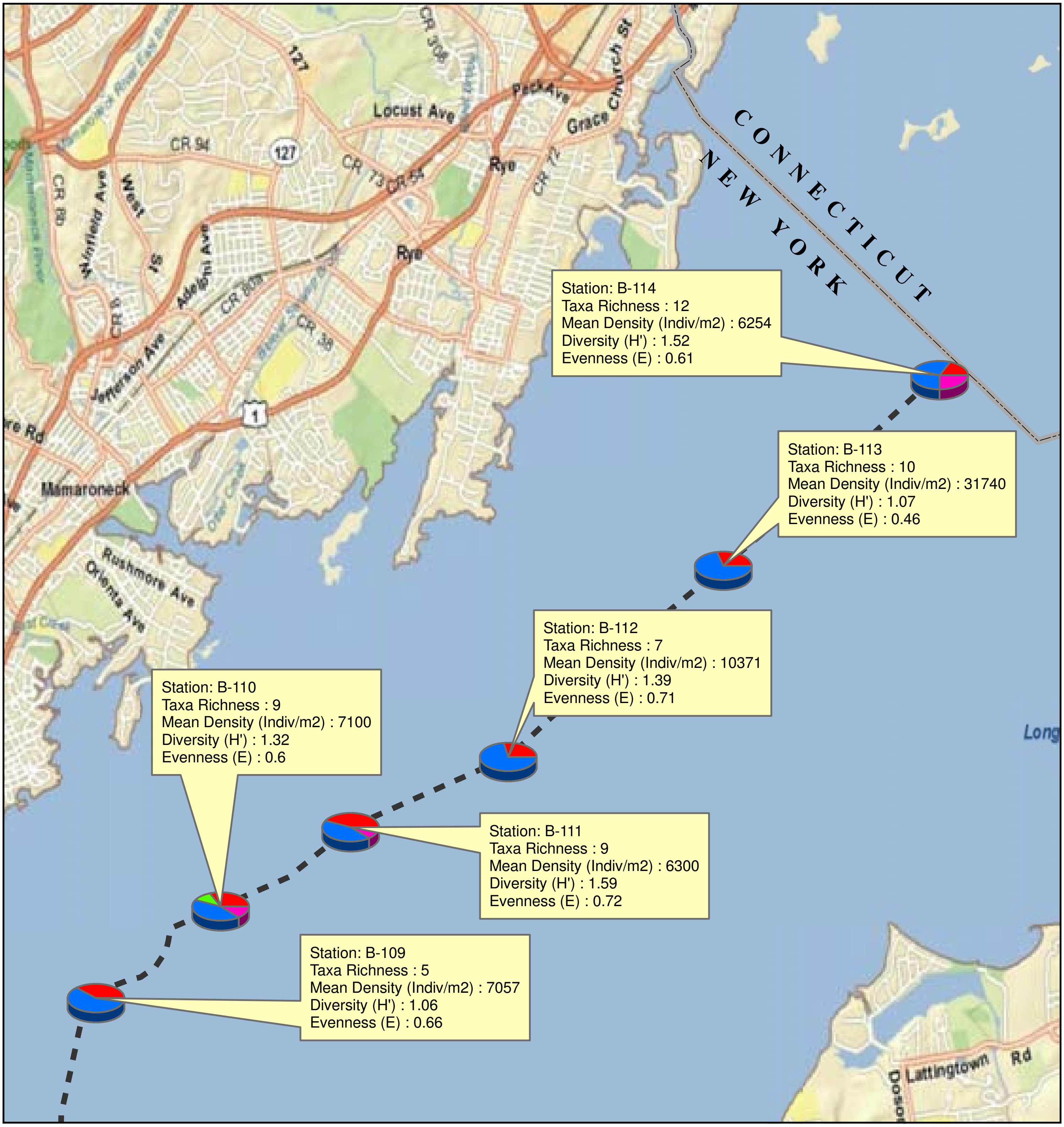
Champlain Hudson Power Express Project

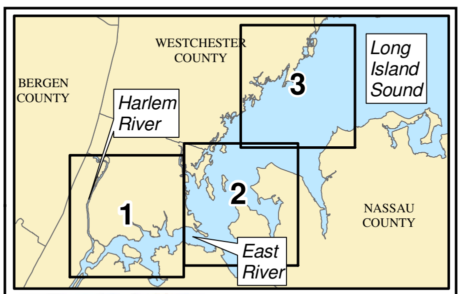
Benthic Community Indices for Grab Locations B-95 to B-113 Harlem and East Rivers, Long Island Sound

SOURCES: ESRI, TDI, TRC

0 2,000 4,000 Feet

Figure 1
Sheet 2 of 3





Transmission Developers Inc.

HDR

DISTRIBUTION OF BENTHIC TAXA

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Benthic Community Indices for Grab Locations B-95 to B-113 Harlem and East Rivers, Long Island Sound

SOURCES: ESRI, TDI, TRC

0 2,000 4,000 Feet

Figure 1

Sheet 3 of 3

Table 1. Benthos Density (individuals/m^2) and Taxa Richness from each sample collected in the Harlem River, East River, and Long Island Sound

					Harlem River				East River					Long Island Sound - New York												
Phylum	Class	Order	Family	GenusSpecies	B-95	B-96	B-97	Harlem River Average	B-99A	B-99B	B-101	B-102	East River Average	B-103	B-104	B-105	B-106	B-107	B-108	B-109	B-110	B-111	B-112	B-113	B-114	LIS - NY. Average
Annelida	Oligochaeta	---	---	---			2,100	**700**	485	257	563	1,400	**676**													
	Polychaeta	Ampharetida	Ampharetidae	---								200	**50**	113												**9**
		Archiannelida	Polygordiidae	*Polygordius sp.*																						
		Ariciida	Orbiniidae	*Leitoscoloplos fragilis*					2,215	2,271			**1,122**	19												**2**
		Canalipalpata	Cirratulidae	---			450	**150**			2,851	23,700	**6,638**	38												**3**
		Capitellida	Capitellidae	---	30	40	1,200	**423**	115	300			**104**	713												**59**
				Clymenella sp.										19	86	200										**25**
		Eunicida	Lumbrinereidae	*Lumbrineris sp.*																						
		Flabelligerida	Flabelligeridae	*Brada sp.*																						
				Pherusa sp.											171	600		2,400		150	100	400	450	110		**398**
		Magelonida	Magelonidae	*Magelona rosea*																						
		Phyllodocida	Glyceridae	*Glycera sp.*										150												**13**
			Hesionidae	---																		100				**8**
			Nephtyidae	*Nephtys sp.*													140		500	450	650	1,500	1,650	1,400	771	**589**
			Nereidae	*Nereis sp.*			150	**50**			938	200	**284**													
			Phyllodocidae	---			600	**200**	46		600	200	**212**	94												**8**
			Polynoidae	---							225	200	**106**	131			10									**12**
			Sigalionidae	---								100	**25**													
			Syllidae	---							75		**19**									100				**8**
		Sabellida	Sabellidae	*Demonax microphthalma*																						
		Scolecida	Scalibregmatidae	*Scalibregma inflatum*																						
		Spionida	Chaetopteriadae	*Chaetopterus variopedatus*																						
			Paraonidae	---											86											**7**
				Aricidea sp.																						
				Paraonis sp.																						
			Sabellidae	---							75	100	**44**													
				Potamilla reniformis																						
			Sabellaridae	*Sabellaria vulgaris*			1,950	**650**			150	8,400	**2,138**	38												**3**
			Spionidae	---																						
				Polydora ligni			2,250	**750**			38		**9**													
				Streblospio benedicti	10		29,253	**9,754**	185	471	38	300	**248**	75												**6**
				Scolecolepides viridis	280	90	3,150	**1,173**																		
				Spiophanes bombyx																						
		Terebellida	Pectinariidae	*Pectinaria gouldii*										19				100			100			100	43	**30**
Arthropoda	Crustacea	Amphipoda	Ampeliscidae	---																						
				Ampelisca abdita						43		600	**161**	825	129	300	20	700			50					**169**
			Aoridae	---	10		1,800	**603**			2,288	1,900	**1,047**	881		100										**82**
				Leptocheirus pinguis																						
				Unciola irrorata			450	**150**																		
			Cancridae	*Cancer irroratus*																						
			Caprellidae	---										38												**3**
			Corophiidae	---																						
				Corophium sp.		10		**3**	531		75	100	**176**													
			Lysianassidae	---										19												**2**
				Lysianopsis alba							75		**19**													
			Haustoriidae	*Neohaustorius sp.*																						
			Melitidae	---							38		**9**													
			Phoxocephalidae	---							75	1,200	**319**													
		Cumacea	Diastylidae	*Diastylis sp.*																						
		Decapoda	Pinnotheridae	*Pinnixa sp.*											129											**11**
				Pinnixa sayana																						
				Pinnotheres maculatus																						
			Porcellanidae	*Polyonyx gibbesi*																						
			Upogebiidae	*Upogebia affinis*																						
			Xanthidae	---								100	**25**													
				Panopeus herbstii							75		**19**													
		Isopoda	Anthuridae	*Cyathura polita*			1,500	**500**			188		**47**													
			Chaetiliidae	*Chiridotea sp.*	10			**3**																		
			Idoteidae	*Edotea sp.*										19	43			100								**13**
		Mysidacea	Mysidae	*Neomysis americana*													10									**1**
		Ostracoda	---	---																						
Chordata	Ascidiacea	Pleurogona	Molgulidae	---																						
				Molgula manhattensis			150	**50**																		
Cnidaria	Anthozoa	Actiniaria	---	---			150	**50**			113		**28**													
		Ceriantharia	Cerianthidae	*Ceriantheopsis americana*																	50	300			257	**61**
Mollusca	Bivalvia	---	---	---																						
		Eudesmodontida	Lyonsiidae	*Lyonsia hyalina*																						
			Pandoridae							129			**32**													
				Pandora Gouldiana																	100				129	**19**
		Myoida	Myidae	*Mya arenaria*																						
		Mytioida	Mytilidae	*Mytilus edulis*							100	100	**50**													
		Nuculoida	Nuculanidae	*Nucula proxima*											1,543	2,100	380	1,800	1,600	2,853	2,100	2,900	1,800	13,000	300	**2,531**
				Yoldia sp.													20		500	150	350	500	600	500	300	**265**
		Prionodontida	Arcidae	*Anadara transversa*																						
		Veneroida	Caudinidae	*Caudina arenata*																				10		**1**
			Mactridae	*Mulinia lateralis*											1,200	5,400	20	4,500		3,453	3,600	100	5,401	15,800	3,686	**3,597**
			Tellinidae	*Tellina sp.*					46				**12**	169								400	450	500	429	**162**
			Veneridae	*Mercenaria mercenaria*											10								20	20	40	**8**
				Gemma gemma																						
	Gastropoda	Archaeogastropoda	Naticidae	*Neverita Duplicata*							10		**3**													
		Cephalaspidea	Atyidae	*Haminoea solitaria*																						
			Scaphandridae	*Acteocina canaliculata*													70							300	129	**42**
		Mesogastropoda	Calyptraeidae	*Crepidula fornicata*							38		**9**													
				Crepidula plana																						
		Neogastropoda	Muricidae	*Eupleura caudata*																						
			Nassariidae	*Ilyanassa obsoleta*																						
				Ilyanassa trivittata										19	343	100	10	500							129	**92**
Nematoda	---	---	---	---			150	**50**																		
Nemertea	---	---	---	---						43			**11**		43										43	**7**
Platyhelminthes	Turbellaria	Polycladida	Stylochidae	*Stylochus ellipticus*																						
		True Taxa Richness			5	3	14	**16**	7	7	21	16	**29**	17	11	7	9	7	3	5	9	9	7	10	12	**33**
		Total Density (individuals/m^2)			340	140	45,305	**15,262**	3,623	3,514	8,625	38,800	**13,641**	3,375	3,781	8,800	680	10,100	2,600	7,057	7,100	6,300	10,371	31,740	6,254	**8,180**

Table 2. True taxa occurrence and total density (individuals/m ^{2}) from each sample collected in the Harlem River, East River, and Long Island Sound

Region	Station Name	True Taxa Occurrence								Density (individuals/m^2) Occurrence							
		Annelida		Arthropoda		Molluska		Other		Annelida		Arthropoda		Molluska		Other	
		#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Harlem River	B-95	3	60%	2	40%	0	0%	0	0%	320	94%	20	6%	0	0%	0	0%
	B-96	2	67%	1	33%	0	0%	0	0%	130	93%	10	7%	0	0%	0	0%
	B-97	9	64%	2	14%	0	0%	3	21%	41104	91%	3750	8%	0	0%	450	1%
	Harlem River	**9**	**56%**	**4**	**25%**	**0**	**0%**	**3**	**19%**	**13851**	**91%**	**1260**	**8%**	**0**	**0%**	**150**	**1%**
East River	B-99A	5	71%	1	14%	1	14%	0	0%	3046	84%	531	15%	46	1%	0	0%
	B-99B	4	57%	1	14%	1	14%	1	14%	3300	94%	43	1%	129	4%	43	1%
	B-101	10	48%	7	33%	3	14%	1	5%	5551	64%	2813	33%	148	2%	113	1%
	B-102	10	63%	5	31%	1	6%	0	0%	34800	90%	3900	10%	100	0%	0	0%
	East River	**14**	**48%**	**8**	**28%**	**5**	**17%**	**2**	**7%**	**11674**	**86%**	**1822**	**13%**	**106**	**1%**	**39**	**0%**
Long Island Sound - New York	B-103	10	59%	5	29%	1	6%	1	6%	1406	42%	1781	53%	188	6%	0	0%
	B-104	3	27%	3	27%	3	27%	2	18%	343	9%	300	8%	3096	82%	43	1%
	B-105	2	29%	2	29%	2	29%	1	14%	800	9%	400	5%	7600	86%	0	0%
	B-106	2	22%	2	22%	4	44%	1	11%	150	22%	30	4%	500	74%	0	0%
	B-107	2	29%	2	29%	2	29%	1	14%	2500	25%	800	8%	6800	67%	0	0%
	B-108	1	33%	0	0%	2	67%	0	0%	500	19%	0	0%	2100	81%	0	0%
	B-109	2	40%	0	0%	3	60%	0	0%	601	9%	0	0%	6456	91%	0	0%
	B-110	3	33%	1	11%	4	44%	1	11%	850	12%	50	1%	6150	87%	50	1%
	B-111	4	44%	0	0%	4	44%	1	11%	2100	33%	0	0%	3900	62%	300	5%
	B-112	2	29%	0	0%	5	71%	0	0%	2100	20%	0	0%	8271	80%	0	0%
	B-113	3	30%	0	0%	7	70%	0	0%	1610	5%	0	0%	30130	95%	0	0%
	B-114	2	17%	0	0%	7	58%	3	25%	814	13%	0	0%	5140	82%	300	5%
	LIS - NY.	**15**	**45%**	**7**	**21%**	**8**	**24%**	**3**	**9%**	**1181**	**14%**	**280**	**3%**	**6716**	**81%**	**68**	**1%**

*Densities for each portion of the route (e.g. Harlem River) are expressed as an average of the densities of individual samples.

Table 3. Benthic community true taxa richness, density (individuals/m^2), Diversity (H'), and Evenness (E) from each sample collected in the Harlem River, East River, and Long Island Sound.

Region	Station	Taxa Richness	Density (total number of individuals/m^2)	Diversity (Shannon-Wiener Function, H')	Evenness (E)	Pollution Sensitive	Pollution Tolerant
Harlem River	B-95	5	340	0.69	0.43	0%	12%
	B-96	3	140	0.83	0.76	0%	29%
	B-97	14	45305	1.46	0.55	3%	72%
	Harlem River Taxa Richness	**16**	---	---	---	---	---
	Harlem River Average	**7.3**	**15262**	**1.47**	**0.53**	**3%**	**71%**
East River	B-99A	7	3623	1.22	0.63	0%	83%
	B-99B	7	3514	1.18	0.61	0%	94%
	B-101	21	8625	2.03	0.67	2%	7%
	B-102	16	38800	1.29	0.47	0%	4%
	East River Taxa Richness	**29**	---	---	---	---	---
	East River Average	**12.75**	**13641**	**1.87**	**0.55**	**0%**	**16%**
Long Island Sound - New York	B-103	17	3375	2.06	0.73	0%	24%
	B-104	11	3781	1.61	0.67	0%	34%
	B-105	7	8800	1.13	0.58	0%	64%
	B-106	9	680	1.38	0.63	10%	3%
	B-107	7	10100	1.43	0.74	0%	45%
	B-108	3	2600	0.93	0.85	0%	0%
	B-109	5	7057	1.06	0.66	0%	49%
	B-110	9	7100	1.32	0.60	0%	51%
	B-111	9	6300	1.59	0.72	0%	2%
	B-112	7	10371	1.39	0.71	0%	52%
	B-113	10	31740	1.07	0.46	1%	50%
	B-114	12	6254	1.52	0.61	3%	59%
	LIS - NY Taxa Richness	**33**	---	---	---	---	---
	LIS - NY Average	**8.8**	**8180**	**1.68**	**0.48**	**1%**	**45%**

*Densities for each portion of the route (e.g. Harlem River) are expressed as an average of the densities of individual samples.

APPENDIX 1

Benthic Macroinvertebrate Data from each Sample in the Harlem River, East River and Long Island Sound

Appendix 1 – Benthic Macroinvertebrate Data from each Sample in the Harlem River, East River and Long Island Sound

Sample_ID	Date	Station	Name	Number Caught	Split Fraction	Density_m2
2010050601	06-May-10	B-95	Scolecolepides viridis	28	1	280
2010050601	06-May-10	B-95	Streblospio benedicti	1	1	10
2010050601	06-May-10	B-95	Capitellidae	3	1	30
2010050601	06-May-10	B-95	Chiridotea sp.	1	1	10
2010050601	06-May-10	B-95	Aoridae	1	1	10
2010050602	06-May-10	B-96	Capitellidae	4	1	40
2010050602	06-May-10	B-96	Corophium sp.	1	1	10
2010050602	06-May-10	B-96	Scolecolepides viridis	9	1	90
2010050603	06-May-10	B-97	Streblospio benedicti	195	0.06666	29252.9253
2010050603	06-May-10	B-97	Polydora ligni	15	0.06666	2250.22502
2010050603	06-May-10	B-97	Sabellaria vulgaris	13	0.06666	1950.19502
2010050603	06-May-10	B-97	Phyllodocidae	4	0.06666	600.060006
2010050603	06-May-10	B-97	Oligochaeta	14	0.06666	2100.21002
2010050603	06-May-10	B-97	Nereis sp.	1	0.06666	150.015002
2010050603	06-May-10	B-97	Capitellidae	8	0.06666	1200.12001
2010050603	06-May-10	B-97	Scolecolepides viridis	21	0.06666	3150.31503
2010050603	06-May-10	B-97	Cirratulidae	3	0.06666	450.045005
2010050603	06-May-10	B-97	Nematoda	1	0.06666	150.015002
2010050603	06-May-10	B-97	Molgula manhattensis	1	0.06666	150.015002
2010050603	06-May-10	B-97	Actiniaria	1	0.06666	150.015002
2010050603	06-May-10	B-97	Cyathura polita	10	0.06666	1500.15002
2010050603	06-May-10	B-97	Unciola irrorata	3	0.06666	450.045005
2010050603	06-May-10	B-97	Aoridae	12	0.06666	1800.18002
2010062501	25-Jun-10	B-99A	Leitoscoloplos fragilis	96	0.43333	2215.40166
2010062501	25-Jun-10	B-99A	Streblospio benedicti	8	0.43333	184.616805
2010062501	25-Jun-10	B-99A	Phyllodocidae	2	0.43333	46.1542012
2010062501	25-Jun-10	B-99A	Capitellidae	5	0.43333	115.385503
2010062501	25-Jun-10	B-99A	Oligochaeta	21	0.43333	484.619112
2010062501	25-Jun-10	B-99A	Tellina sp.	2	0.43333	46.1542012
2010062501	25-Jun-10	B-99A	Corophium sp.	23	0.43333	530.773314
2010062502	25-Jun-10	B-99B	Leitoscoloplos fragilis	53	0.23333	2271.46102
2010062502	25-Jun-10	B-99B	Streblospio benedicti	11	0.23333	471.435306
2010062502	25-Jun-10	B-99B	Nemertea	1	0.23333	42.8577551
2010062502	25-Jun-10	B-99B	Capitellidae	7	0.23333	300.004286
2010062502	25-Jun-10	B-99B	Oligochaeta	6	0.23333	257.146531
2010062502	25-Jun-10	B-99B	Paraonidae	3	0.23333	128.573265
2010062502	25-Jun-10	B-99B	Ampelisca abdita	1	0.23333	42.8577551
2010050513	05-May-10	B-101	Mytilus edulis	10	1	100
2010050513	05-May-10	B-101	Neverita duplicata	1	1	10
2010050513	05-May-10	B-101	Nereis sp.	25	0.2666	937.734434
2010050513	05-May-10	B-101	Sabellidae	2	0.2666	75.0187547
2010050513	05-May-10	B-101	Crepidula fornicata	1	0.2666	37.5093773
2010050513	05-May-10	B-101	Panopeus herbstii	2	0.2666	75.0187547
2010050513	05-May-10	B-101	Cirratulidae	76	0.2666	2850.71268
2010050513	05-May-10	B-101	Oligochaeta	15	0.2666	562.64066
2010050513	05-May-10	B-101	Phyllodocidae	16	0.2666	600.150038
2010050513	05-May-10	B-101	Sabellaria vulgaris	4	0.2666	150.037509
2010050513	05-May-10	B-101	Polynoidae	6	0.2666	225.056264
2010050513	05-May-10	B-101	Streblospio benedicti	1	0.2666	37.5093773

2010050513	05-May-10	B-101	Polydora ligni	1	0.2666	37.5093773
2010050513	05-May-10	B-101	Syllidae	2	0.2666	75.0187547
2010050513	05-May-10	B-101	Cyathura polita	5	0.2666	187.546887
2010050513	05-May-10	B-101	Aoridae	61	0.2666	2288.07202
2010050513	05-May-10	B-101	Phoxocephalidae	2	0.2666	75.0187547
2010050513	05-May-10	B-101	Lysianopsis alba	2	0.2666	75.0187547
2010050513	05-May-10	B-101	Melitidae	1	0.2666	37.5093773
2010050513	05-May-10	B-101	Corophium sp.	2	0.2666	75.0187547
2010050513	05-May-10	B-101	Actiniaria	3	0.2666	112.528132
2010050512	05-May-10	B-102	Sabellaria vulgaris	84	0.1	8400
2010050512	05-May-10	B-102	Cirratulidae	237	0.1	23700
2010050512	05-May-10	B-102	Streblospio benedicti	3	0.1	300
2010050512	05-May-10	B-102	Nereis sp.	2	0.1	200
2010050512	05-May-10	B-102	Ampharetidae	2	0.1	200
2010050512	05-May-10	B-102	Phyllodocidae	2	0.1	200
2010050512	05-May-10	B-102	Polynoidae	2	0.1	200
2010050512	05-May-10	B-102	Sigalionidae	1	0.1	100
2010050512	05-May-10	B-102	Sabellidae	1	0.1	100
2010050512	05-May-10	B-102	Oligochaeta	14	0.1	1400
2010050512	05-May-10	B-102	Xanthidae	1	0.1	100
2010050512	05-May-10	B-102	Ampelisca abdita	6	0.1	600
2010050512	05-May-10	B-102	Aoridae	19	0.1	1900
2010050512	05-May-10	B-102	Corophium sp.	1	0.1	100
2010050512	05-May-10	B-102	Phoxocephalidae	12	0.1	1200
2010050512	05-May-10	B-102	Mytilus edulis	1	0.1	100
2010050511	05-May-10	B-103	Tellina sp.	9	0.53333	168.751055
2010050511	05-May-10	B-103	Ilyanassa trivittata	1	0.53333	18.7501172
2010050511	05-May-10	B-103	Ampelisca abdita	44	0.53333	825.005156
2010050511	05-May-10	B-103	Aoridae	47	0.53333	881.255508
2010050511	05-May-10	B-103	Lysianassidae	1	0.53333	18.7501172
2010050511	05-May-10	B-103	Caprellidae	2	0.53333	37.5002344
2010050511	05-May-10	B-103	Pectinaria gouldii	1	0.53333	18.7501172
2010050511	05-May-10	B-103	Sabellaria vulgaris	2	0.53333	37.5002344
2010050511	05-May-10	B-103	Glycera sp.	8	0.53333	150.000938
2010050511	05-May-10	B-103	Ampharetidae	6	0.53333	112.500703
2010050511	05-May-10	B-103	Phyllodocidae	5	0.53333	93.7505859
2010050511	05-May-10	B-103	Streblospio benedicti	4	0.53333	75.0004688
2010050511	05-May-10	B-103	Polynoidae	7	0.53333	131.25082
2010050511	05-May-10	B-103	Capitellidae	38	0.53333	712.504453
2010050511	05-May-10	B-103	Clymenella sp.	1	0.53333	18.7501172
2010050511	05-May-10	B-103	Edotea sp.	1	0.53333	18.7501172
2010050511	05-May-10	B-103	Leitoscoloplos fragilis	1	0.53333	18.7501172
2010050511	05-May-10	B-103	Cirratulidae	2	0.53333	37.5002344
2010050510	05-May-10	B-104	Mercenaria mercenaria	1	1	10
2010050510	05-May-10	B-104	Pherusa sp.	4	0.23333	171.43102
2010050510	05-May-10	B-104	Nemertea	1	0.23333	42.8577551
2010050510	05-May-10	B-104	Nucula proxima	36	0.23333	1542.87918
2010050510	05-May-10	B-104	Mulinia lateralis	28	0.23333	1200.01714
2010050510	05-May-10	B-104	Ilyanassa trivittata	8	0.23333	342.862041
2010050510	05-May-10	B-104	Pinnixa sp.	3	0.23333	128.573265

Appendix 1 – Benthic Macroinvertebrate Data from each Sample in the Harlem River, East River and Long Island Sound

2010050510	05-May-10	B-104	Ampelisca abdita	3	0.23333	128.573265
2010050510	05-May-10	B-104	Edotea sp.	1	0.23333	42.8577551
2010050510	05-May-10	B-104	Clymenella sp.	2	0.23333	85.7155102
2010050510	05-May-10	B-104	Paraonidae	2	0.23333	85.7155102
2010050509	05-May-10	B-105	Pherusa sp.	6	0.1	600
2010050509	05-May-10	B-105	Clymenella sp.	2	0.1	200
2010050509	05-May-10	B-105	Mulinia lateralis	54	0.1	5400
2010050509	05-May-10	B-105	Nucula proxima	21	0.1	2100
2010050509	05-May-10	B-105	Ilyanassa trivittata	1	0.1	100
2010050509	05-May-10	B-105	Ampelisca abdita	3	0.1	300
2010050509	05-May-10	B-105	Aoridae	1	0.1	100
2010050508	05-May-10	B-106	Nephtys sp.	14	1	140
2010050508	05-May-10	B-106	Polynoidae	1	1	10
2010050508	05-May-10	B-106	Nucula proxima	38	1	380
2010050508	05-May-10	B-106	Mulinia lateralis	2	1	20
2010050508	05-May-10	B-106	Yoldia sp.	2	1	20
2010050508	05-May-10	B-106	Ilyanassa trivittata	1	1	10
2010050508	05-May-10	B-106	Acteocina canaliculata	7	1	70
2010050508	05-May-10	B-106	Ampelisca abdita	2	1	20
2010050508	05-May-10	B-106	Neomysis americana	1	1	10
2010050507	05-May-10	B-107	Pherusa sp.	24	0.1	2400
2010050507	05-May-10	B-107	Pectinaria gouldii	1	0.1	100
2010050507	05-May-10	B-107	Nucula proxima	18	0.1	1800
2010050507	05-May-10	B-107	Mulinia lateralis	45	0.1	4500
2010050507	05-May-10	B-107	Ilyanassa trivittata	5	0.1	500
2010050507	05-May-10	B-107	Ampelisca abdita	7	0.1	700
2010050507	05-May-10	B-107	Edotea sp.	1	0.1	100
2010050506	05-May-10	B-108	Nephtys sp.	5	0.1	500
2010050506	05-May-10	B-108	Yoldia sp.	5	0.1	500
2010050506	05-May-10	B-108	Nucula proxima	16	0.1	1600
2010050505	05-May-10	B-109	Nephtys sp.	3	0.0666	450.45045
2010050505	05-May-10	B-109	Pherusa sp.	1	0.0666	150.15015
2010050505	05-May-10	B-109	Mulinia lateralis	23	0.0666	3453.45345
2010050505	05-May-10	B-109	Nucula proxima	19	0.0666	2852.85285
2010050505	05-May-10	B-109	Yoldia sp.	1	0.0666	150.15015
2010050504	05-May-10	B-110	Nephtys sp.	13	0.2	650
2010050504	05-May-10	B-110	Pherusa sp.	2	0.2	100
2010050504	05-May-10	B-110	Pectinaria gouldii	2	0.2	100
2010050504	05-May-10	B-110	Ampelisca abdita	1	0.2	50
2010050504	05-May-10	B-110	Ceriantheopsis americana	1	0.2	50
2010050504	05-May-10	B-110	Pandora gouldiana	2	0.2	100
2010050504	05-May-10	B-110	Yoldia sp.	7	0.2	350
2010050504	05-May-10	B-110	Mulinia lateralis	72	0.2	3600
2010050504	05-May-10	B-110	Nucula proxima	42	0.2	2100
2010050503	05-May-10	B-111	Nephtys sp.	15	0.1	1500
2010050503	05-May-10	B-111	Pherusa sp.	4	0.1	400
2010050503	05-May-10	B-111	Ceriantheopsis americana	3	0.1	300
2010050503	05-May-10	B-111	Syllidae	1	0.1	100
2010050503	05-May-10	B-111	Hesionidae	1	0.1	100
2010050503	05-May-10	B-111	Yoldia sp.	5	0.1	500

2010050503	05-May-10	B-111	Tellina sp.	4	0.1	400
2010050503	05-May-10	B-111	Nucula proxima	29	0.1	2900
2010050503	05-May-10	B-111	Mulinia lateralis	1	0.1	100
2010050502	05-May-10	B-112	Mercenaria mercenaria	2	1	20
2010050502	05-May-10	B-112	Pherusa sp.	3	0.06666	450.045005
2010050502	05-May-10	B-112	Nephtys sp.	11	0.06666	1650.16502
2010050502	05-May-10	B-112	Mulinia lateralis	36	0.06666	5400.54005
2010050502	05-May-10	B-112	Nucula proxima	12	0.06666	1800.18002
2010050502	05-May-10	B-112	Yoldia sp.	4	0.06666	600.060006
2010050502	05-May-10	B-112	Tellina sp.	3	0.06666	450.045005
2010050501	05-May-10	B-113	Caudina arenata	1	1	10
2010050501	05-May-10	B-113	Mercenaria mercenaria	2	1	20
2010050501	05-May-10	B-113	Pherusa sp.	2	0.18181	110.00495
2010050501	05-May-10	B-113	Pectinaria gouldii	1	0.1	100
2010050501	05-May-10	B-113	Nephtys sp.	14	0.1	1400
2010050501	05-May-10	B-113	Mulinia lateralis	158	0.1	15800
2010050501	05-May-10	B-113	Nucula proxima	130	0.1	13000
2010050501	05-May-10	B-113	Yoldia sp.	5	0.1	500
2010050501	05-May-10	B-113	Tellina sp.	5	0.1	500
2010050501	05-May-10	B-113	Acteocina canaliculata	3	0.1	300
2010042604	26-Apr-10	B-114	Mercenaria mercenaria	4	1	40
2010042604	26-Apr-10	B-114	Nephtys sp.	18	0.23333	771.439592
2010042604	26-Apr-10	B-114	Pectinaria gouldii	1	0.23333	42.8577551
2010042604	26-Apr-10	B-114	Ceriantheopsis americana	6	0.23333	257.146531
2010042604	26-Apr-10	B-114	Nemertea	1	0.23333	42.8577551
2010042604	26-Apr-10	B-114	Pandora gouldiana	3	0.23333	128.573265
2010042604	26-Apr-10	B-114	Yoldia sp.	7	0.23333	300.004286
2010042604	26-Apr-10	B-114	Tellina sp.	10	0.23333	428.577551
2010042604	26-Apr-10	B-114	Mulinia lateralis	86	0.23333	3685.76694
2010042604	26-Apr-10	B-114	Nucula proxima	7	0.23333	300.004286
2010042604	26-Apr-10	B-114	Ilyanassa trivittata	3	0.23333	128.573265
2010042604	26-Apr-10	B-114	Acteocina canaliculata	3	0.23333	128.573265