Appendices

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Appendix A

Standard Operating Procedure for Unconsolidated (Non-Vegetated) River Bottom Assessment (reprinted from the HDA Work Plan)

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Appendix A - Standard Operating Procedure for Unconsolidated (Non-Vegetated) River Bottom Assessment

I. Objective

The objective of this Standard Operating Procedure (SOP) is to set forth methods to measure the range of existing conditions of unconsolidated (non-vegetated) river bottom habitats within River Sections 1, 2, and 3 of the Upper Hudson River. The assessment activities that will be performed in the field are described generally in Section 2.2.2.1 of the *Habitat Delineation and Assessment Work Plan* (HDA Work Plan; Blasland, Bouck & Lee, Inc. [BBL], 2003) for the Upper Hudson River. This SOP provides a methodology for collecting information to document the range of conditions in the unconsolidated river bottom habitat as it currently exists.

Measurements described in this SOP are based on physical characteristics of habitat structure. Habitat structure is defined as the physical components and the organization or pattern of a habitat, community or ecosystem. Habitat structure and ecological functions are intrinsically linked, and in general, when there is suitable habitat structure, aquatic communities and associated ecosystem functions are present. This approach is consistent with the Record of Decision (ROD) for the Upper Hudson River (United States Environmental Protection Agency [USEPA], 2002) and previous studies that have shown that successful fluvial replacement and reconstruction projects depend mainly on the presence of suitable physical habitat (e.g., Gore, 1985).

The functions to be assessed for the unconsolidated river bottom habitats and the specific measurements to be taken in the field to quantify those functions, along with a brief rationale for each, are shown in Table A-1 (below). The measurements will be used to develop functional capacity indices (FCIs) for unconsolidated bottom functions, so as to allow for management decisions regarding reallocation of functions among the replaced and reconstructed habitats, if necessary. FCIs are values calculated from the field habitat measurements that provide a synthesis of information for evaluating habitat functions – in this case, the functions listed in Table A-1. FCIs provide a site-specific basis for describing the functional capacity of a habitat at a specific location, and for comparing functional capacity among locations. In developing these FCIs, pre-existing models such as Habitat Suitability Indices (HSIs) may be used (for specific representative indicator species) or project-specific FCI models may be developed. The conceptual foundations for the application of project-specific FCIs are discussed generally in Ainslie et al. (1999) and Smith and Wakeley (2001), and specifically for the Hudson River in Findlay et al. (2002). While the focus of these studies was on riverine wetlands, the overall approach to developing and using FCIs is applicable to and will be used for characterizing unconsolidated bottom habitats.

Table A-1. Unconsolidated River Bottom		
Function	**Measured Variable**	**Rationale**
Potential to Support Macroinvertebrates	Total organic carbon Substrate and cover Embeddedness Percent fines	Food resources for BMI Protection from predation; attachment Availability of cobble, gravel for attachment Burrowing substrate; related to TOC
Potential to Support Fish Populations	Substrate and cover Embeddeness Percent fines	Protection from predation; spawning substrate Availability of cobble, gravel for spawning substrate Related to embeddedness

FCIs will be developed for each function listed in Table A-1 and each station sampled (as described in Section III below). These FCIs, together with the underlying data, associated maps (as necessary), and the specific protocols used to develop the FCIs, will be presented to USEPA in the *Habitat Assessment Reports* referenced in the HDA Work Plan.

II. Necessary Materials and Equipment

- Small boat with standard water safety gear (e.g., personal flotation device [PFD]; first aid kit)
- Protective gear for working in water (e.g., hip waders, wetsuit, drysuit)
- Foul weather gear
- Rapid Bioassessment Protocols (RBP) guidance document
- Differential Global Positioning System (DGPS) unit
- Dive equipment (diving flag, SCUBA and/or snorkel)
- Camera
- Binoculars
- Field guide(s)
- Field log book

III. Sampling Design

As described in the HDA Work Plan, unconsolidated bottom habitats will be delineated and mapped based on the side-scan sonar output and substrate characterization data from the Sediment Sampling and Analysis Program (SSAP). That program will provide sonar coverage of the entire river bottom, along with approximately 6,000 surface sediment samples with total organic carbon measurements and sediment classification and 450 samples with quantitative analyses for grain size distribution. As part of habitat delineation activities, the information from side-scan sonar and sediment sampling programs will be integrated into a series of overlay habitat delineation maps. These maps will be used to identify a suite of sampling strata for the detailed habitat assessment activities. These strata will be based on one or more key parameters relevant to unconsolidated river bottom habitats, such as sediment type, three-dimensional structure, flow, overlying water depth, presence of organic macroparticles, and others as appropriate.

Unconsolidated bottom comprises a large proportion of in-river habitat in the Upper Hudson River. Based on existing information, it is estimated that approximately 2,700 acres (approximately 1100

hectares) of unconsolidated bottom habitat is present in River Sections 1, 2 and 3 (approximately 3900 acres of total river bottom in project area minus approximately 1,200 acres of vegetated river bottom habitat). The detailed habitat assessment activities will be conducted in a representative portion of that total habitat area, with the goal of conducting such activities in approximately 5% of the total area of unconsolidated bottom. Based on the assumption that a sampling station would cover, on average, approximately one acre, a total of 135 representative sampling stations will be selected for the detailed functional assessment. These stations will be selected, using the information from the habitat delineation maps, side-scan sonar output, and substrate characterization, together with available information on areas to be dredged, so as to meet the following criteria:

1. Adequately characterize all the habitat strata identified from the habitat delineation information, as described above;

2. Include a roughly equivalent number of target stations (in dredge areas) and reference stations (in non-dredge areas); and

3. Be allocated among River Sections in rough proportion to the relative areas of unconsolidated river bottom habitats to be dredged in each River Section.

At each sampling station, nine samples will be collected, for a total of 1,215 samples. The use of nine samples per station provides flexibility in the design so that multiple strata within each station can be sampled with replication. The specific sample points will be selected to best characterize the strata within the station. (Note that samples will be located within stations as appropriate to cover the strata present and based on the amount of dredging to be completed. Thus, an area of uniform bottom or where limited dredging is planned will receive fewer sample points than an area of heterogeneous bottom or where more extensive dredging is planned.)

IV. Methods

The protocols described in this SOP for assessing unconsolidated river bottom habitat are adapted from the USEPA Rapid Bioassessment Protocols (Barbour et al., 1999). Sampling will be conducted by trained, experienced personnel (per Barbour et al., 1999) using SCUBA, snorkeling gear, or wading. Sample locations will not be disturbed by sampling personnel prior to making habitat parameter estimates.

Habitat parameters will be determined in areas where unconsolidated bottom is present. Areas to be sampled within the unconsolidated habitat will be determined as described in Section III. Following the collection and review of side-scan sonar output and substrate characterization data from the SSAP, sampling will be conducted between June 1 and September 30 in accordance with the following steps:

1. Establish the nine sampling points at each station (as described in Section III). The sampling points will be located such that replicate measurements are taken randomly from within each stratum at the station. Record locations with DGPS. Also record weather conditions on and prior to the day of the survey, as well as watershed and in-stream features, in the field log book.

2. As described by Barbour et al. (1999), estimate and record percent composition of inorganic features of the substrate observed in the sampling area (approximately 2.0 m^2), using Table A-2, by visual and/or tactile evaluation.

Table A-2. Inorganic Substrate Components		
Substrate Type	**Diameter (millimeters [mm])**	**Percent Composition (0-100%)**
Bedrock		
Boulder	> 256 mm (10 inches)	
Cobble	64 – 256 mm (2.5 – 10 inches)	
Gravel	2 – 64 mm (0.1 – 2.5 inches)	
Sand	0.06 – 2 mm (gritty)	
Silt	0.004 – 0.06 mm	
Clay	<0.004 mm (slick)	

(Adapted from Barbour et al., 1999)

3. As described by Barbour et al. (1999), estimate and record percent composition of organic features of the substrate, using Table A-3, in the same area and by the same techniques as described in Step 2.

Table A-3. Organic Substrate Components		
Substrate Type	**Characteristic**	**Percent Composition (0-100%)**
Detritus	Sticks, wood, course plant material (CPOM)	
Muck-Mud	Black, very fine organic (FPOM)	
Marl	Grey, shell fragments	

(Adapted from Barbour et al., 1999)

4. As described by Barbour et al. (1999), estimate and record the presence and character of structural substrate/habitat cover, using Table A-4, in the same area and by the same techniques as described in Step 2.

Table A-4. Epifaunal Substrate / Available Cover		
Category	**Stable Habitat (For Low Gradient Conditions)**	**Stable Habitat (For High Gradient Conditions)**
Optimal – mix of snags, submerged logs, cobble, or other stable habitat	> 50%	> 70%
Suboptimal – mix of stable habitat well-suited for colonization and new fall	30 – 50%	40 – 70%
Marginal – habitat availability less than desirable; substrate frequently disturbed or removed	10 – 30%	20 – 40%
Poor – lack of habitat obvious; substrate unstable or lacking	< 10%	< 20%

(Adapted from Barbour et al., 1999)

5. As described by Barbour et al. (1999), estimate and record the level of embeddedness of large-diameter material, using Table A-5, in the same area by the same techniques as described in Step 2. Do not complete this step if the substrate is greater than 75% sand, silt, or clay. Complete this step only for high gradient areas.

Table A-5. Embeddedness

Category	Surrounded by Fine Sediment
Optimal – gravel, cobble and boulder particles largely uncovered; layer of cobble provides diversity of niche space	0 – 25%
Suboptimal – gravel, cobble and boulder particles partially covered	25 - 50%
Marginal – gravel, cobble and boulder particles more than 50% covered	50 – 75%
Poor – gravel, cobble and boulder particles mostly covered and difficult to discern	> 75%

(Adapted from Barbour et al., 1999)

6. As described by Barbour et al. (1999), estimate and record the level of optimal pool substrate characteristics using Table A-6 in the same area by the same techniques as described in Step 2. Complete this step only for low gradient areas.

Table A-6. Pool Substrate Characterization

Category	Stable Habitat[1]
Optimal – mix of substrate materials, with gravel and firm sand prevalent; root mats and SAV common	> 80%
Suboptimal – mix of soft sand, mud or clay; mud may be dominant; some root mats and SAV present	55 – 75%
Marginal – all mud or clay or sand bottom; little or no root mat; no SAV	30 – 50%
Poor – hard-pan clay or bedrock; no root mat or SAV	< 25%

(Adapted from Barbour et al., 1999)

1. Values of percent derived from scores associated with each category (Barbour et al, 1999)

7. As described by Barbour et al. (1999), estimate and record the channel flow status using Table A-7 in the same area by the same techniques as described in Step 2.

Table A-7. Channel Flow Status

Category	Percent Channel Filled with Water
Optimal – water reaches base of both lower banks and minimal amount of channel substrate is exposed.	100%
Suboptimal – water fills > 75% of available channel; or < 25% of channel substrate is exposed.	> 75%
Marginal – water fills between 25-75% of channel and/or riffle substrates are mostly exposed.	25 – 75%
Poor – very little water in channel and mostly standing pools.	< 25%

(Adapted from Barbour et al., 1999)

8. Repeat the observations at one sampling point per station using different crew member and compare observations on percent composition. Stations where repeated observations deviate from original estimates by 20% or more will be reassessed.

9. When on station, qualified topside personnel shall survey the surrounding unconsolidated bottom to document the occurrence or signs of wildlife species that can be observed by these personnel (e.g., diving ducks). In addition, in-water personnel shall survey the area of unconsolidated bottom being sampled for the occurrence or signs of in-water wildlife species, such as mussels, snails, or vertebrates (e.g., turtles). Record observations, including a qualitative narrative synopsis, on Table E-1 provided in Attachment E to the HDA Work Plan.

10. Move to the next sampling point and repeat Steps 2 through 9.

As discussed in Section I, the specific habitat parameter results described above will be used to develop FCIs (which may include HSIs) for each function listed in Table A-1 (above) and each station sampled. The approach to be used in developing the FCIs will follow the same general approach used by Ainslie et al. (1999) and Findlay et al. (2002) and/or may use pre-existing HSI models. If HSIs are used, HSI information for selected indicator species will be obtained from http://www.nwrc.usgs.gov/wdb/pub/hsi/hsiindex.htm. Preliminary FCI models and the lists of species for which HSIs (if used) will be calculated will be provided in the *Habitat Delineation Report*. The specific methods used will be described, together with the underlying data and the FCI results, in the *Habitat Assessment Reports* referenced in the HDA Work Plan.

It should be re-emphasized that the steps described above are those modified from Barbour et al., (1999) for visually surveying stream and wadeable river habitats through a rapid bioassessment approach. Other components of the protocols by Barbour et al. (1999) (e.g. record of velocity/depth, pool variability, and sediment deposition) that are not described in this SOP would not be achievable for a visual survey of unconsolidated river bottoms in the mostly unwadeable habitats of the Upper Hudson River. Therefore, for these components, the data collected as part of the SSAP will be used to assign scores, as applicable.

V. References

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Appendix B

Standard Operating Procedure for Aquatic Vegetation Bed Assessment (reprinted from the HDA Work Plan)

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Appendix B - Standard Operating Procedure for Aquatic Bed Assessment

I. Objective

The objective of this Standard Operating Procedure (SOP) is to set forth methods to measure the range of existing conditions, including cover, shoot density, and above-ground biomass, within submerged aquatic vegetation (SAV) habitats in River Sections 1, 2, and 3 of the Upper Hudson River. The assessment activities that will be performed are described generally in Section 2.2.2.2 of the *Habitat Delineation and Assessment Work Plan* (HDA Work Plan; Blasland, Bouck & Lee, Inc. [BBL], 2003). This SOP provides further details on the procedures for collecting information to document the range of conditions in the aquatic bed habitats.

Measurements described in this SOP are based primarily on characteristics of habitat structure. Habitat structure is defined as the physical components and the organization or pattern of a habitat, community or ecosystem. Habitat structure and ecological functions are intrinsically linked, and in general, when suitable habitat structure exists, aquatic communities and associated ecosystem functions are present. The approach described in this SOP is consistent with the Record of Decision (ROD) for the Upper Hudson River (United States Environmental Protection Agency [USEPA], 2002) and previous studies that have shown that successful fluvial replacement and reconstruction projects depend mainly on the presence of suitable physical habitat (e.g., Gore, 1985).

The functions to be assessed for the aquatic bed habitats, the specific measurements to be taken in the field and laboratory to quantify those functions, and a brief rationale for their measurement are shown in Table B-1. The measurements will be used to develop functional capacity indices (FCIs) for the aquatic bed functions, so as to allow for management decisions regarding reallocation of functions among the replaced and reconstructed habitats, if necessary. FCIs are values calculated from the field habitat and laboratory measurements that provide a synthesis of information for evaluating habitat functions – in this case, the functions listed in Table B-1 (below). FCIs provide a site-specific basis for describing the functional capacity of a habitat at a specific location, and for comparing functional capacity among locations. For the functions related to providing habitat for fish, pre-existing Habitat Suitability Indices (HSIs) may be used for specific representative indicator species. Otherwise, project-specific FCI models will be developed. The conceptual foundations for the application of project-specific FCIs are discussed generally in Ainslie et al. (1999) and Smith and Wakeley (2001), and specifically for the Hudson River in Findlay et al. (2002). While the focus of these studies was on riverine wetlands, the overall approach to developing and using FCIs is generally applicable to and will be used for characterizing aquatic bed habitats.

Table B-1. Aquatic Bed		
Function	**Measured Variable**	**Rationale**
Macrophyte Primary Productivity	Shoot biomass Percent cover	Represents productivity Areal extent of productivity for SAV bed
Support PMI/BMI Populations	Shoot biomass Shoot density Percent cover Plant species composition Light availability Water depth Current velocity	Represents available food resources for BMI/PMI Substrate for PMI settlement; dampens wave/ current energy Protection from predation Plant architecture related to number of PMI Growth productivity of SAV and epiphytes Correlated to light availability Settlement of PMI; scouring of BMI habitat
Provide Habitat for Fish Populations	Shoot biomass Shoot density Percent cover Plant species composition	Represents available food resources for BMI/PMI Related to ease of movement within SAV bed Protection from predation; access to open water Meadow versus canopy species offer differing levels of protection / access
Stabilization of Substrate	Shoot density Percent cover Percent fines Current velocity	Dampens wave/current energy Areal extent of dampening effect Related to potential for resuspension of sediment Higher current scours or resuspends more sediment
Water Quality Enhancement	Shoot density Percent fines	Shoots dampen wave/current energy allow particles to settle out of suspension Related to potential for resuspension of sediment
Nutrient Cycling	Shoot biomass Percent fines Sediment nutrient availability	Standing crop of organic material Related to anaerobic conditions (allows denitrification); related to organic material in sediment Indicates availability of nutrients cycled from organic matter

FCIs will be developed for each function listed in Table B-1 and each station sampled (as described in Section III below). These FCIs, together with the underlying data, associated maps (as necessary), and the specific protocols used to develop the FCIs, will be presented to USEPA in the *Habitat Assessment Reports* referenced in the HDA Work Plan.

II. Necessary Materials and Equipment

- Small boat with standard water safety gear (e.g., personal flotation device; first aid kit)
- Differential Global Positioning System (DGPS) unit
- Protective gear for working in water (e.g., hip waders, wetsuit, drysuit)
- Dive equipment (e.g., diving flag, SCUBA and/or snorkel gear)
- Field log book
- Sampling quadrat (1 meter [m] x 1 m, polyvinyl chloride [PVC]) with permanent marks every 25 centimeters (cm) on each side
- Sampling subquadrat (25 cm x 25 cm, PVC)

- Tubes for collecting sediment cores (PVC or Lexan)
- Light meter (photoactive radiation sensor)
- Sounding line, calibrated in centimeters
- Water velocity meter
- Random number table
- Sealable storage bags, pre-labeled
- Cooler(s) with ice
- Range finder (optical)
- Camera
- Binoculars
- Field guide(s)
- Laboratory support equipment (e.g., jars, labels, etc.)

III. Sampling Design

As described in the HDA Work Plan, aquatic bed habitats will be delineated and mapped based on aerial photographs and in-field groundtruthing of that remotely sensed information, as well as the side-scan sonar output and substrate characterization data from the Sediment Sampling and Analysis Program (SSAP). That program will provide sonar coverage of the entire river bottom, along with approximately 6,000 surface sediment samples with total organic carbon measurements and sediment classification and 450 samples with quantitative analyses for grain size distribution. As part of habitat delineation activities, the information from the aerial photographs, groundtruthing, and SSAP will be integrated into a series of overlay habitat delineation maps. These maps will be used to identify a suite of sampling strata for the detailed habitat assessment activities. These strata will based on one or more key parameters relevant to aquatic bed habitats, such as bed size, species composition, plant cover, sediment type, flow, overlying water depth, and others as appropriate.

To assist in developing a sampling design for characterizing aquatic bed habitats, a limited preliminary field study was conducted in aquatic beds in the Upper Hudson River in August 2002. Based on the field team's experience in aquatic bed sampling and reconnaissance of beds in the river, seven stations were sampled in the 2002 study: six stations within River Section 1 and one station in River Section 2. At each station, three transects were placed perpendicular to shore, and three quadrats were randomly placed along a transect for a total of nine samples per station. The quadrats were used to define the area within which samples were collected (shoot density and biomass) and from which percent cover was recorded. A map showing the locations of those stations and a table summarizing the results are provided in Figure B-1 and Exhibit B-1 to this SOP.

After considering observations made during the August 2002 field investigation and the results of the investigation and data analysis, it was determined by professional judgment that a distribution of (on average) approximately two sampling stations (of nine samples each) per river mile of potentially impacted aquatic bed habitat, with a corresponding distribution of stations in unimpacted (reference) areas, would be appropriate for characterizing aquatic bed habitats. Based on our current knowledge about the distribution of aquatic bed habitat in the Upper Hudson River, aquatic bed habitat over an approximate 13-mile area may potentially be impacted by the proposed remedial activities. Data collected during the assessment of candidate Phase 1 areas will be used to further assess the variability between sampling locations and to evaluate whether any modification to the sampling design is warranted. The results of such further assessment will be provided to USEPA, along with any proposal to modify the sampling program arising out of the further assessment.

Based on the foregoing evaluation, 52 stations will be selected for the detailed functional assessment of aquatic bed habitat (26 in dredge areas and 26 in reference or non-dredge areas). These stations will be selected, using the information from the habitat delineation maps, side-scan sonar output and substrate characterization, together with available information on areas to be dredged, so as to best meet the following criteria:

1. Adequately characterize all aquatic bed habitat strata identified from the habitat delineation information, as described above;
2. Include an equal number of target stations (in dredge areas) and reference stations (in non-dredge areas), as also described above; and
3. Be allocated among River Sections in a rough proportion to the relative areas of aquatic bed habitat to be dredged (i.e., potentially affected aquatic bed habitat) in each River Section.

At each sampling station, nine samples will be collected, for a total of 468 samples. The use of nine samples per station provides flexibility in the design so that multiple strata within each station can be sampled with replication. The specific sample points will be selected to best characterize the strata within the station. The overall sample design combines judgmental and stratified random sampling (USEPA, 2000) into a comprehensive design for characterizing aquatic bed habitats.

For the purposes of the HDA Work Plan, data collected during the limited August 2002 field study (Exhibit B-1) were analyzed to determine the statistical resolution of the proposed sampling design. During the August 2002 study, each sampling station consisted of three transects, with three quadrats per transect (n=9), randomly located in SAV beds of various sizes.

Data were analyzed using non-parametric statistical comparisons (statistical program output below), visual comparisons (graphs below), and calculated relative width of confidence intervals (Exhibit B-2) to determine the resolution of the data. The relative width of confidence intervals is the width of the confidence interval expressed as a percentage of the mean. The confidence interval endpoints are the mean plus or minus this percentage of the mean. The confidence interval analyses indicate that reported mean values are within approximately $\pm$35 to 39% of actual values for the 95th percentile confidence interval, which is an acceptable resolution to meet the program objectives.

In making these comparisons, significant differences were observed between stations, indicating the sample size of 9 is sufficient to detect statistically significant differences in above-ground biomass, percent cover, and shoot density. The ability to detect meaningful differences between stations will provide useful information for the habitat replacement and reconstruction program (e.g., planting density).

Substrate measurements collected as part of the SSAP will also be used to characterize the aquatic bed habitat. These measurements include bulk density, water content, USCS classification, grain size distribution, Atterberg limits, specific gravity, and total organic carbon (see QEA, 2002). As described above, SSAP sample locations will be included on the habitat delineation maps to indicate where SSAP samples were collected in SAV habitat, and additional sediment samples will be collected as necessary to adequately characterize the SAV areas.

IV. Methods

The protocols described in this SOP address both field and laboratory methods. Field and laboratory analyses will be conducted by trained, experienced personnel.

A. Field

Following the collection of aerial photographs (anticipated to be July) and digitization, mapping and groundtruthing of the aquatic beds, sampling will be conducted during the peak of the SAV growing season, between July 15 and August 30. Shoot density, percent cover, and aboveground biomass will be quantified using 1-m square quadrats taken randomly from within the strata at the location.

Plant characteristics, sediment nutrient availability, light availability, current velocity data and wildlife observation data will be collected as distinct tasks using the following protocols.

Plant Characteristics

1. Using SCUBA or snorkeling equipment, collect samples from within sampling quadrats randomly placed within each stratum.
2. Record the center of each sampling quadrat using DGPS.
3. Visually estimate percent cover of the 1-m square quadrat and record in field book.
4. Randomly select two 25 cm x 25 cm subquadrats of the 1-m quadrat. Remove all aboveground material by clipping and store in a pre-labeled sealable bag.
5. Place sample in cooler for transport to the laboratory for processing for shoot density and aboveground biomass.
6. Repeat observations on percent cover at one sampling point per station using different crew member and compare observations. Stations where repeated observations deviate from original estimates by 20% or more will be reassessed.

Sediment Nutrient Availability

1. Using SCUBA or snorkeling equipment, collect surface sediment sample from the center of one randomly selected quadrat from each stratum used for collecting plant characteristic data using a PVC coring tube. Follow Steps 3-7. If the sediment depth is less than 5 cm or presence of large-diameter substrate prevents the collection of a sediment core, proceed to Step 2.
2. Lower a ponar grab from the boat and collect a sample from the center of the quadrat. Retrieve the grab and place on deck. Subsample the collected material to obtain sufficient quantity to fill a PVC tube. Place caps on ends of tube and proceed to Step 5.
3. Remove both end caps from a 2-inch diameter PVC tube, press tube into substrate approximately 12 cm. Place cap on top of tube and slowly extract core from substrate. If necessary, place a dive knife or small shovel under the PVC tube to prevent the sample from falling out as the tube is extracted.
4. Place cap on bottom of tube. Bring to surface and once above surface water, place in holder until any suspended material has settled, then decant excess water from top of tube. Wipe excess water from tube and seal both ends with tape.
5. Place label on tube indicating location, transect number, quadrat number, and date.
6. Place tube in sealable bag and store on ice in cooler.
7. Ship collected samples to the laboratory for processing (by methods provided in Barko et al., 1988).

Light Availability and Water Depth

1. Handheld equipment for measuring photosynthetically active radiation (e.g., Licor 1400 photometer) will be maintained and calibrated in accordance with the manufacturer's instructions. This equipment will be operated from the boat. The air (surface light) and underwater sensors will be attached to the data logger in accordance with the manufacturer's instructions. The underwater sensor will be attached to the sensor platform in accordance with the manufacturer's instructions.
2. Place air sensor on level surface in full sunlight.
3. Outside the deep edge of the bed, lower the sensor platform into the water to a depth of 0.5 m. Record air (surface) and underwater light readings.
4. Lower the calibrated sounding line to the bottom. Record water depth to the nearest centimeter.
5. Lower the sensor platform to a depth of 1 m. Record air (surface) and underwater light readings.
6. Move to the approximate center of the SAV bed, and repeat Steps 3 (at placement of the meter) and5.
7. Lower the calibrated sounding line to the bottom. Record water depth to the nearest centimeter.

Current Velocity

1. Collect velocity data from outside and within the SAV bed using an electromagnetic velocity meter. The instrument will be maintained and calibrated in accordance with the manufacturer's instructions. This equipment will be operated from the boat. The meter will be secured to a long metal or PVC pole to allow raising and lowering of the meter in the water. The pole will be marked at 10 cm and 1 m intervals from the bottom.
2. Orient the meter head directly parallel with the flow. Flagging or streamers (e.g., from cassette tape material) should be tied to the vertical rod to assist with orientation of the meter.
3. Outside the deep edge of the bed, place the meter 10 cm above the substrate. Record velocity.
4. Raise the meter to 1 m above the substrate. Record velocity.
5. Move to the approximate center of the SAV bed and repeat Steps 3 (at placement of the meter) and 4.

Wildlife Observations

1. When on station, qualified topside personnel shall survey the surrounding aquatic bed to document the occurrence or signs of wildlife species that can be observed (e.g., diving ducks).
2. In-water personnel shall survey the area of aquatic bed being sampled for the occurrence or signs of in-water wildlife species, such as mussels, snails, or vertebrates (e.g., turtles).
3. Record observations, including a qualitative narrative synopsis, on Table E-1 provided in Attachment E to the HDA Work Plan.

B. Laboratory

The following tasks will be performed by a contract laboratory.

***Vallisneria americana* (adapted from Biernacki and Lovett-Doust, 1997)**

1. Rinse plants with tap water.
2. Carefully remove and discard invertebrates, algae, etc. from blades.
3. Sort out unattached blades or root mass material not part of an intact shoot.

4. Count the number of intact shoots, and record total number. This number will be used to calculate shoot density.
5. Remove trace belowground material if present.
6. Place all aboveground material (e.g., shoots, blades etc.) in pre-labeled tin foil bag.
7. Refrigerate at cool temperature until drying.
8. Clean and dry glass 1 liter (L) beakers to be used for drying the samples.
9. Determine and record the tare weight of each beaker using precision scale. Mass should be recorded to the nearest $1/100^{th}$ of a gram.
10. Use scale to record the initial mass of the sample in the beaker before beginning the drying procedure.
11. Place the samples in the laboratory oven for 24 hours at 85 (+/- 1) °C. Confirm that the oven is connected to ventilation system through use of flexible ductwork.
12. Remove samples at the end of 24-hours and place in the desiccator for approximately 45 minutes to confirm the complete removal of water from the samples and to allow for cooling of the sample to room temperature.
13. Record the mass of the samples immediately after removal from the desiccator.
14. Return the samples to the oven for 1 hour, place in desiccator and record the mass for constant mass reading (within 5% of the previous measurement).
15. Repeat Step 14 until constant mass is reached.
16. Place samples in sealed bags for archiving and store at room temperature.

Other Species (each species will be processed separately)

Follow the procedures described above for *Vallisneria americana*, with the following exception. In Step 4, count and record the number of primary stems for each species present.

Sediment Nutrient Analysis (Barko et al., 1988)

1. Remove end caps from tube and extrude 10 cm of material through the top of the tube into a clean glass container.
2. Thoroughly homogenize sample with Teflon coated mixing spoon (or similar).
3. For extractable P: Mix (by shaking) 2 grams of wet sediment with 25 milliliters (ml) of extractant containing 0.3 N NH_4F and 0.025 N HCl for 1 minute. Proceed to Step 6.
4. For exchangeable ammonium-N and K: Mix (by shaking) 5 grams of wet sediment with 50 ml of an extractant containing 1 M NaCl for 1 minute. Proceed to Step 6.
5. For moisture content: follow steps 5-12 in the *Vallisneria americana* procedures above, substituting 250 mL beakers for the 1 L beakers, and using approximately 2 grams of sediment as the sample.
6. Filter extract. Acidify with HCl to pH of 2.0.
7. Use flow-injection analysis procedure for Lachat Quik-Chem Auto-Analyzer (or similar autoanalysis technique) to determine concentrations of extracted nutrients.
8. Express nutrient concentrations on basis of sediment dry mass following correction for moisture content.

C. Development of FCIs

As discussed in Section I, the specific measurements described above will be used to develop FCIs for each function listed in Table B-1 (above) and each station sampled. The FCIs for the fish habitat function may include HSIs for representative indicator species. The approach to be used to develop the FCIs will follow the same general approach used by Ainslie et al. (1999), Smith and Wakeley (2001), and Findlay et al. (2002) and/or, for the fish habitat function, may use pre-existing HSI models. HSI

information for selected indicator species will be obtained from http://www.nwrc.usgs.gov/wdb/pub/hsi/hsiindex.htm. Preliminary FCI models and the lists of species for which HSIs will be calculated will be provided in the *Habitat Delineation Report*. The specific methods used will be described, together with the underlying data and the FCI results, in the *Habitat Assessment Reports* referenced in the HDA Work Plan.

V. References

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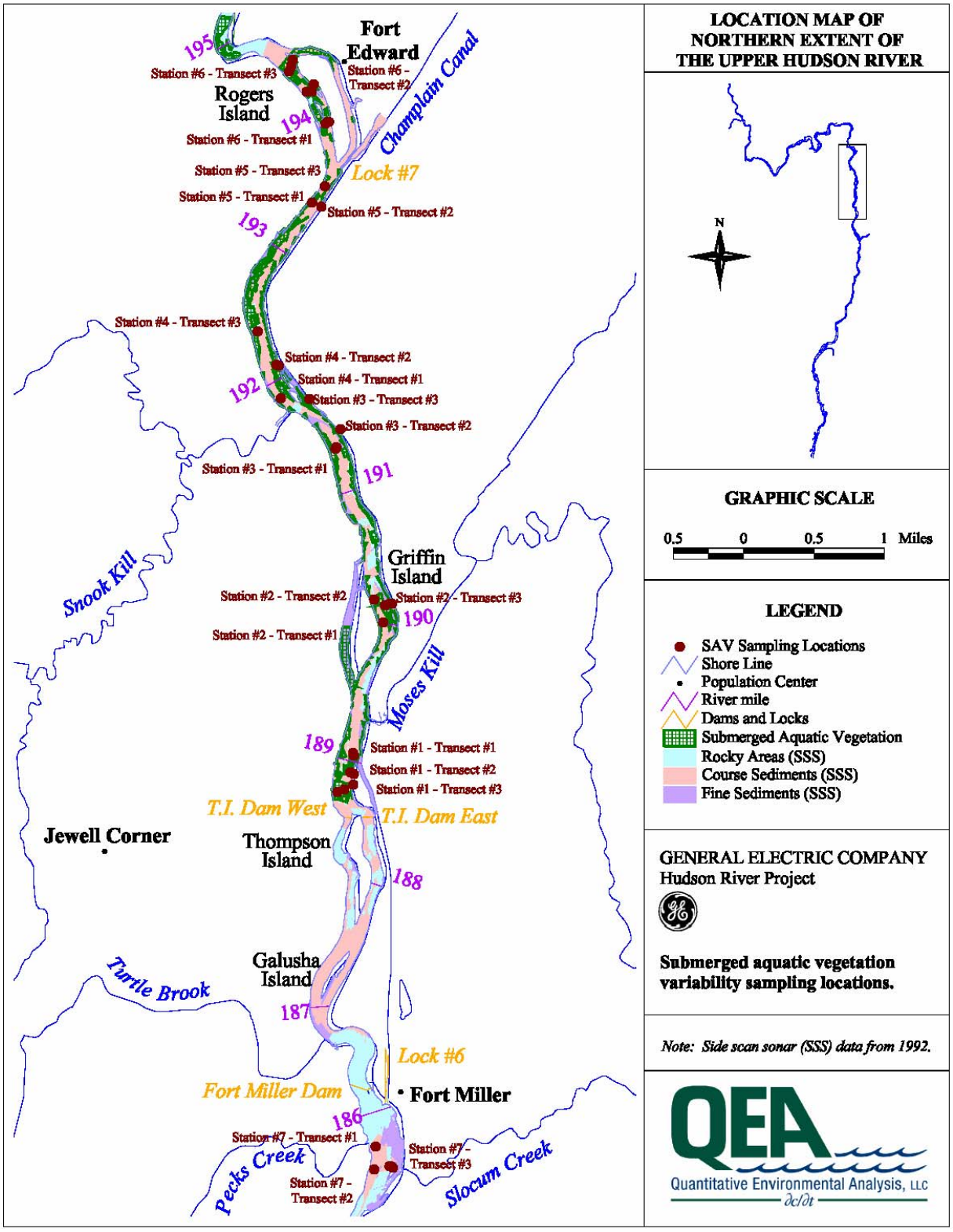

Fort Edward
Rogers Island
Champlain Canal
Lock #7
Griffin Island
Snook Kill
Moses Kill
T.I. Dam West
T.I. Dam East
Jewell Corner
Thompson Island
Galusha Island
Turtle Brook
Lock #6
Fort Miller Dam
Fort Miller
Pecks Creek
Slocum Creek
195
194
193
192
191
190
189
188
187
186
Station #6 - Transect #3
Station #6 - Transect #2
Station #6 - Transect #1
Station #5 - Transect #3
Station #5 - Transect #1
Station #5 - Transect #2
Station #4 - Transect #3
Station #4 - Transect #2
Station #4 - Transect #1
Station #3 - Transect #3
Station #3 - Transect #2
Station #3 - Transect #1
Station #2 - Transect #2
Station #2 - Transect #3
Station #2 - Transect #1
Station #1 - Transect #1
Station #1 - Transect #2
Station #1 - Transect #3
Station #7 - Transect #1
Station #7 - Transect #3
Station #7 - Transect #2
LOCATION MAP OF NORTHERN EXTENT OF THE UPPER HUDSON RIVER
N
GRAPHIC SCALE
0.5 0 0.5 1 Miles
LEGEND
SAV Sampling Locations
Shore Line
Population Center
River mile
Dams and Locks
Submerged Aquatic Vegetation
Rocky Areas (SSS)
Course Sediments (SSS)
Fine Sediments (SSS)
GENERAL ELECTRIC COMPANY
Hudson River Project
Submerged aquatic vegetation variability sampling locations.
Note: Side scan sonar (SSS) data from 1992.
QEA
Quantitative Environmental Analysis, LLC
∂c/∂t

Exhibit B-1
Data Collected from Aquatic Beds in the Upper Hudson River (August 2002)

Date	Station	Transect	Depth	Spp	Final Dry Weight (g)	Comments	# of Shoots	Depth (m)	Cover (%)	Distance from Shore (m)	Light				Current	
											1M		0.5M			
											Air	Water	Air	Water	1M (ft/s)	Bottom (ft/s)
8/5/2002	1	1	Shallow	Va	0	No biomass collected	0	0.2	0	0						
8/5/2002	1	1	Middle	Va	5.33	x	18	0.99	95	0						
8/5/2002	1	1	Middle	Other	0.02	x	3	0.99	95	0						
8/5/2002	1	1	Deep	Va	8.02	x	27	2.01	75	0		340		435	0.07	0.08
8/5/2002	1	2	Shallow	Va	5.62	x	14	0.65	50	0						
8/5/2002	1	2	Middle	Va	6.48	x	36	1.2	75	0						
8/5/2002	1	2	Deep	Va	9.35	x	10	2.4	50	0		932	--	1154	0.25	0.1
8/5/2002	1	3	Shallow	Va	5.59	East	14	1.75	80	0						
8/5/2002	1	3	Shallow	Va	15.48	West	41	1.45	100	0		270	--	950		
8/5/2002	1	3	Deep	Va	1.99	x	7	2.62	5	0		1605	--	1093	0.52	0.52
8/5/2002	2	1	Shallow	Va	2.44	x	17	0.25	40	1.35		613	--	750		
8/5/2002	2	1	Middle	Va	3.82	x	15	1.42	75	6.75						
8/6/2002	2	1	Middle	Other	0.11	x	8	1.42	75	6.75						
8/5/2002	2	1	Deep	Va	3.58	x	8	2.25	40	13.5						
8/5/2002	2	2	Shallow	Va	0.97	x	8	0.37	50	1.37				528	--	0.07
8/6/2002	2	2	Middle	Va	12.58	x	7	1.55	100	6.85						
8/6/2002	2	2	Middle	Other	1.98	x	10	1.55	100	6.85						
8/6/2002	2	2	Deep	Va	8.57	x	23	2.53	70	13.7					0.06	0.08
8/6/2002	2	3	Shallow	Va	27.43	x	59	2.3	95	52.2	1601	965	1625	1194	0.49	0.44
8/6/2002	2	3	Middle	Va	10.24	x	40	1.78	50	85.95						
8/6/2002	2	3	Deep	Va	7.33	x	45	1.78	60	131.67	501	253	914	415	0.26	0.35
8/5/2002	2	3	Deep	Other	0.78	x	5	1.78	60	131.67	501	253	914	415	0.26	0.35
8/6/2002	3	1	Shallow	Va	2.64	x	27	0.72	85	7						
8/6/2002	3	1	Shallow	Other	0.02	x	5	0.72	85	7						
8/6/2002	3	1	Middle	Va	0.27	x	5	1.8	80	30.17	1790	737	1767	1221	0.36	0.15
8/6/2002	3	1	Middle	Other	15.7	x	10	1.8	80	30.17	1790	737	1767	1221	0.36	0.15
8/6/2002	3	1	Deep	Va	6.98	x	47	2.3	70	42.06	811	25	2005	631	0.36	0.3
8/6/2002	3	2	Shallow	Va	2.36	x	11	0.28	40	5.4			1440	789	--	0
8/6/2002	3	2	Shallow	Other	0.48	x	3	0.28	40	5.4			1440	789	--	0
8/8/2002	3	2	Middle	Va	10.2	x	23	0.86	45	9.7						
8/6/2002	3	2	Middle	Other	0.17	Fragments contribute to biomass	1	0.86	45	9.7						
8/6/2002	3	2	Deep	Va	22.24	x	5	1.32	50	14.1						

Exhibit B-1
Data Collected from Aquatic Beds in the Upper Hudson River (August 2002)

Date	Station	Transect	Depth	Spp	Final Dry Weight (g)	Comments	# of Shoots	Depth (m)	Cover (%)	Distance from Shore (m)	Light				Current	
											1M		0.5M			
											Air	Water	Air	Water	1M (ft/s)	Bottom (ft/s)
8/8/2002	3	3	Shallow	Va	10.69	West	38	0.85	100	7.1						
8/8/2002	3	3	Shallow	Other	0.07	West/Biomass are frags	0	0.85	100	7.1						
8/8/2002	3	3	Shallow	Va	5.22	East	17	0.53	70	0.54						
8/8/2002	3	3	Middle	Va	2.93	x	14	1.42		24.69	1449	685	1545	1143	0 (out of bed)	0.19 (in bed)
8/8/2002	3	3	Middle	Other	0.4	x	10	1.42		24.69	1449	685	1545	1143	0 (out of bed)	0.19 (in bed)
8/8/2002	4	1	Shallow	Va	6.77	x	33	0.49	70	7.9						
8/8/2002	4	1	Shallow	Other	0.32	Fragments contribute to biomass	1	0.49	70	7.9						
8/8/2002	4	1	Middle	Va	2.35	x	14	1.26	75	0						
8/8/2002	4	1	Deep	Va	42.99	x	97	2.3	80	22.86	1781	680	1744	1213	0.89 (out of bed)	1.25 (out of bed)
8/8/2002	4	2	Shallow	Va	3.85	x	69	0.75	80	8.7						
8/8/2002	4	2	Middle	Va	3.66	x	30	1.8	60	23.77	2027	738	2036	1149		
8/8/2002	4	2	Deep	Va	18.71	x	95	1.63	100	56.69	2075	334	2027	846	0.22 (out of bed)	0.17 (out of bed)
8/8/2002	4	3	Shallow	Va	4.25	x	37	1.33	35	12.8						
8/8/2002	4	3	Middle	Va	5.87	x	39	1.7	60	28.35						0 (out of bed)
8/8/2002	4	3	Deep	Va	17.83	x	69	1.82	85	36.58	1330	797	2026	1453	0 (out of bed)	0.14 (out of bed)
8/8/2002	4	3	Deep	Other	0.66	Biomass are frags	0	1.82	85	36.58	1330	797	2026	1453	0 (out of bed)	0.14 (out of bed)
8/8/2002	5	1	Shallow	Va	2.03	x	10	0.5	50	5.3						
8/8/2002	5	1	Middle	Va	12.34	x	41	0.95	55	6.7	1790	125	1665	391		0
8/8/2002	5	1	Middle	Other	0.07	Biomass are frags	0	0.95	55	6.7	1790	125	1665	391		0
8/8/2002	5	1	Deep	Va	4.47	x	8	1.92		8.5						
8/8/2002	5	2	Shallow	Va	0.28	x	5	0.009	5	1.9						
8/8/2002	5	2	Middle	Va	1.72	x	18	0.2	25	3.6						
8/8/2002	5	2	Middle	Other	0.31	x	1	0.2	25	3.6						
8/8/2002	5	2	Deep	Va	3.85	x	29	0.7	70	5.4	1841	460	2266	1320	0.14 (out of bed)	0.25 (out of bed)
8/8/2002	5	3	Shallow	Va	2.96	x	14	0.11	40	3.6						
8/8/2002	5	3	Middle	Va	13.01	x	33	0.52	100	5.4						
8/8/2002	5	3	Deep	Va	3.62	x	27	1.8	70	7.7			700	332	0 (out of bed)	0.24
8/8/2002	6	1	Shallow	Va	3.98	West	15	1.72	95	40.23					0.24 (out of	0.14 (out of

Exhibit B-1
Data Collected from Aquatic Beds in the Upper Hudson River (August 2002)

Date	Station	Transect	Depth	Spp	Final Dry Weight (g)	Comments	# of Shoots	Depth (m)	Cover (%)	Distance from Shore (m)	Light				Current	
											1M		0.5M			
											Air	Water	Air	Water	1M (ft/s)	Bottom (ft/s)
															bed)	bed)
8/8/2002	6	1	Middle	Va	7.99	x	22	1.7	100	61.26	1366	270	1345	1141		
8/8/2002	6	1	Shallow	Va	4.32	East	38	0.95		61.26	1445	978	1445	581	0.58 (out of bed)	0.72 (out of bed)
8/8/2002	6	2	Shallow	Va	6.66	East	17	0.86	100	8.3	1748	971	1760	1398		
8/8/2002	6	2	Shallow	Other	0.42	East/Biomass are frags	0	0.86	100	8.3	1748	971	1760	1398		
8/8/2002	6	2	Middle	Va	8.36	x	43	1.26	100	0					1.3 (out of bed)	1.4 (out of bed)
8/9/2002	6	2	Shallow	Va	12.76	West	29	1.05	100	138.07	1131	820	1751	1042	1.23 (out of bed) 0.7 (in bed)	1.04 (out of bed) 0.75 (in bed)
8/8/2002	6	3	Shallow	Va	3.44	West	12	0.65	75	11			1818	921		0.3 (out of bed)
8/8/2002	6	3	Middle	Va	3.07	x	31	1.37	75	122.53	1764	813	1778	1204	1.5	2
8/8/2002	6	3	Middle	Other	0.81	x	5	1.37	75	122.53	1764	813	1778	1204	1.5	2
8/8/2002	6	3	Shallow	Va	1.67	East	20	0.6	75	64			1902	1528	--	1.41 (out of bed)
8/8/2002	6	3	Shallow	Other	1.82	East	6	0.6	75	64			1902	1528	--	1.41 (out of bed)
8/8/2002	7	1	Shallow	Va	4.69	x	22	0.8	100	9.8						
8/8/2002	7	1	Middle	Va	5.18	x	29	0.58	80	31.09						
8/8/2002	7	1	Deep	Va	2.8	x	17	1.95	100	37.49			1188	780	0.45 (out of bed) 0.25 (in bed)	0.8 (out of bed) 0.04 (in bed)
8/8/2002	7	2	Shallow	Va	2.55	x	18	0.12	85	6						
8/8/2002	7	2	Shallow	Other	0.7	x	7	0.12	85	6						
8/8/2002	7	2	Middle	Va	0.55	x	9	0.62	35	32.92			1444	736	0	0
8/8/2002	7	2	Deep	Va	3.47	x	19	1.18	95	41.15						
8/8/2002	7	3	Shallow	Va	0.64	x	13	0.12	65	4.2			1353	1092	--	0
8/8/2002	7	3	Middle	Va	6.3	x	22	1.08	60	36.58						
8/8/2002	7	3	Deep	Va	9.74	x	31	0.25	70	61.26						

Exhibit B-2

SIGNIFICANCE TESTS FOR CORRELATIONS BETWEEN SAV AND STATION PARAMETERS

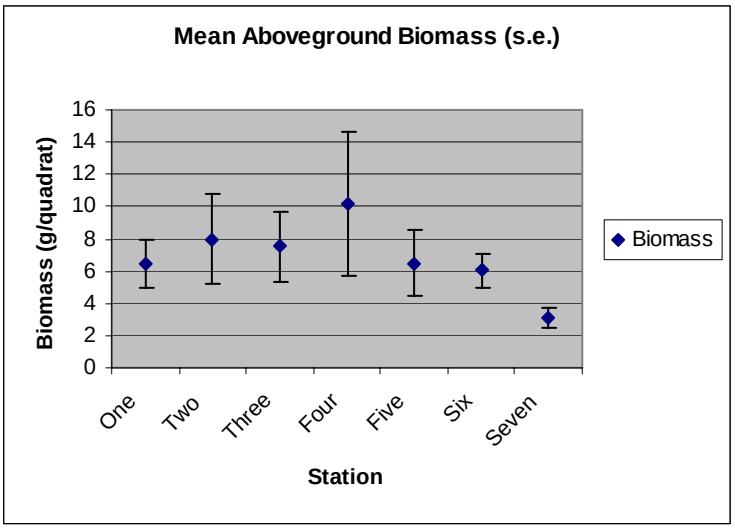
Spearman's rank correlations:

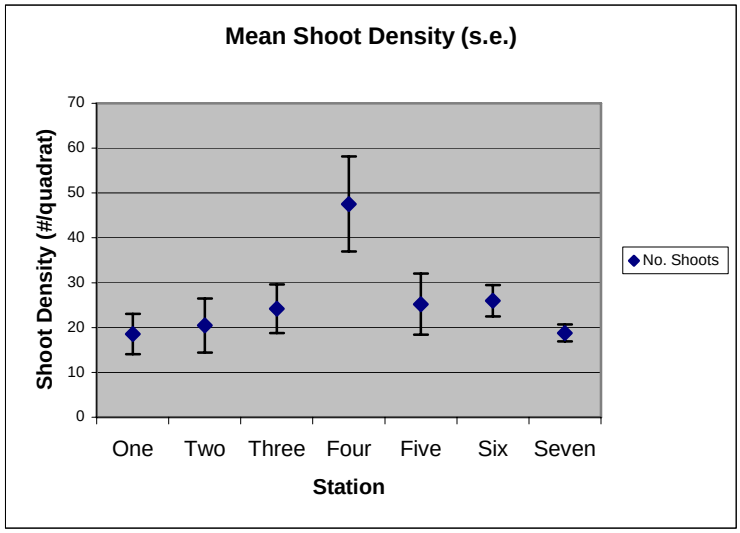
Biomass and Depth
normal-z = 2.988, p-value = **0.0028** **SIGNIFICANT RELATIONSHIP** (p<0.05)
NoShoots and Biomass
normal-z = 4.7324, p-value = **0.0** **SIGNIFICANT RELATIONSHIP** (p<0.05)
CoverPct and Biomass
normal-z = 3.2799, p-value = **0.001** **SIGNIFICANT RELATIONSHIP** (p<0.05)
NoShoots and Depth
normal-z = 1.4699, p-value = **0.1416** NO SIGNIFICANT RELATIONSHIP (p>0.05)
CoverPct and Depth
normal-z = 1.4184, p-value = **0.1561** NO SIGNIFICANT RELATIONSHIP (p>0.05)

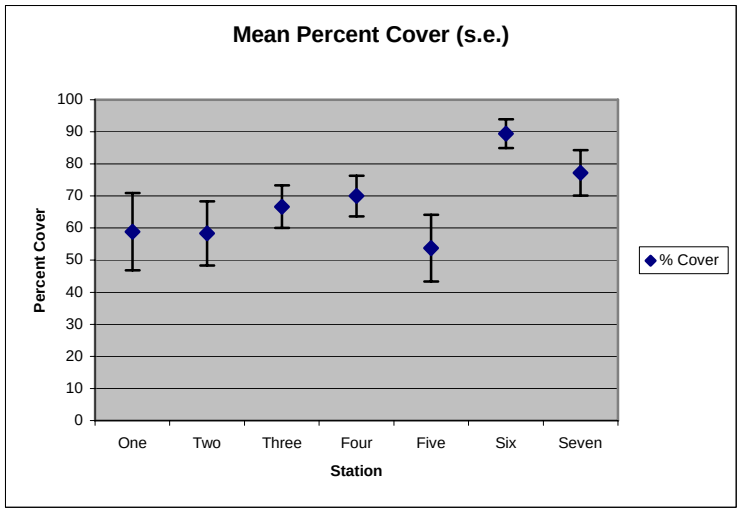
EVALUATE DIFFERENCES BETWEEN STATIONS (See Graphs Below)

Kruskal-Wallis rank sum test

NoShoots and Station
Kruskal-Wallis chi-square = 12.3977, df = 6, p-value = **0.0537** **SIGNIFICANT DIFFERENCE** (p<0.10)
CoverPct and Station
Kruskal-Wallis chi-square = 11.6572, df = 6, p-value = **0.0701** **SIGNIFICANT DIFFERENCE** (p<0.10)
Biomass and Station
Kruskal-Wallis chi-square = 4.9662, df = 6, p-value = **0.5482** NO SIGNIFICANT DIFFERENCE (p>0.10)




Mean Shoot Density (s.e.)
Shoot Density (#/quadrat)
70
60
50
40
30
20
10
0
One
Two
Three
Four
Five
Six
Seven
Station
No. Shoots


Mean Percent Cover (s.e.)
Percent Cover
100
90
80
70
60
50
40
30
20
10
0
One
Two
Three
Four
Five
Six
Seven
Station
% Cover

	Relative Width of Conf.Limits		
	90%	95%	99%
Dry Weight [a]			
Station1	35%	42%	58%
Station2	31%	37%	52%
Station3	37%	44%	62%
Station4	30%	36%	50%
Station5	38%	45%	63%
Station6	22%	26%	36%
Station7	35%	41%	57%
Shallow	18%	20%	27%
Middle	18%	21%	27%
Deep	20%	23%	29%
All Samples (n=63)	11%	12%	16%
Station Avg (n=9)	33%	39%	54%
No. of Shoots [b]			
Station1	38%	45%	63%
Station2	31%	37%	51%
Station3	29%	34%	48%
Station4	23%	27%	38%
Station5	26%	30%	42%
Station6	17%	20%	27%
Station7	14%	17%	23%
Shallow	23%	27%	35%
Middle	13%	15%	19%
Deep	16%	18%	23%
All Samples (n=63)	10%	11%	14%
Station Avg (n=9)	29%	35%	48%
Percent Cover [c]			
Station1	44%	52%	73%
Station2	24%	29%	40%
Station3	24%	29%	41%
Station4	19%	22%	31%
Station5	48%	57%	80%
Station6	33%	39%	54%
Station7	21%	26%	36%
Shallow	22%	25%	33%
Middle	15%	17%	23%
Deep	19%	22%	28%
All Samples (n=63)	10%	12%	15%
Station Avg (n=9)	31%	37%	51%

[a] - ln (Dry Weight +1) transform used

[b] - sqrt (No. of Shoots) transform used

[c] - asin(sqrt(Percent Cover/100)) transform used

Appendix C

Standard Operating Procedure for Natural Shoreline Assessment (reprinted from the HDA Work Plan)

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Appendix C - Standard Operating Procedure for Natural Shoreline Assessment

I. Objective

The objective of this Standard Operating Procedure (SOP) is to set forth methods to measure the range of existing habitat conditions for natural shorelines within River Sections 1, 2, and 3 of the Upper Hudson River. The assessment activities that will be performed are described generally in Section 2.2.3.2 of the *Habitat Delineation and Assessment Work Plan* (HDA Work Plan; Blasland, Bouck & Lee, Inc. [BBL], 2003) for the Upper Hudson River. This SOP provides a methodology for collecting information to document the range of conditions in the natural shoreline habitats as they currently exists along the Upper Hudson River. (Note that this SOP does not address maintained shorelines, which will be addressed during remedial design.)

Measurements described in this SOP are based on characteristics of habitat structure. Habitat structure is defined as the physical components and the organization or pattern of a habitat, community or ecosystem. Habitat structure and ecological functions are intrinsically linked, and in general, when there is suitable habitat structure, aquatic communities and associated ecosystem functions are present. This approach is consistent with the Record of Decision (ROD) for the Upper Hudson River (United States Environmental Protection Agency [USEPA], 2002) and previous studies that have shown that successful fluvial replacement and reconstruction projects depend mainly on the presence of suitable physical habitat (e.g., Gore, 1985). Although the approach in the ROD (Responsiveness Summary, page 9-33) is specific to river bottoms, an adaptation of this approach is both applicable and relevant to shorelines.

The functions to be assessed for the natural shoreline habitats, the specific measurements to be taken in the field to quantify those functions, and a brief rationale for their measurement are shown in Table C-1. The measurements will be used to develop functional capacity indices (FCIs) for the natural shoreline habitats, so as to allow for management decisions regarding reallocation of functions among the replaced and reconstructed habitats, if necessary. FCIs are values calculated from the field measurements that provide a synthesis of information for evaluating habitat functions - in this case, the functions listed in Table C-1. FCIs provide a site-specific basis for describing the functional capacity of a habitat at a specific location, and for comparing functional capacity among locations. For the wildlife habitat function, pre-existing Habitat Suitability Indices (HSIs) for specific representative indicator species may be used in addition to or in lieu of FCIs. Otherwise, project-specific FCI models will be developed. The conceptual foundations for the application of project-specific FCIs are discussed generally in Ainslie et al. (1999) and Smith and Wakeley (2001), and specifically for the Hudson River in Findlay et al. (2002). While these studies address riverine wetlands, the overall approach to developing and using FCIs is applicable to and will be used for characterizing natural shoreline habitats.

Table C-1. Shoreline		
Function	**Measured Variable**	**Rationale**
Shoreline Stability	Downfall (trees/m2) Bank stability Bank vegetation protection	Large trees armor bank against scour Stable banks less likely to slump, fail Presence indicates longer term stability
Shade and Cover	Downfall (trees/m2) Bank vegetation protection Riparian edge cover	Provides in-water cover; organic food source Overstory provides shade, thermal cooling Cover for wildlife accessing shoreline
Wildlife Habitat (Habitat suitability)	Downfall (trees/m2) Bank stability Bank vegetation protection Riparian edge cover	Provides in-water cover; organic food source Less open areas; ease of access to water Shade and cover for access Protection from predation between access points

FCIs will be developed for each function listed in Table C-1 and each station sampled (as described in Section III below). These FCIs, together with the underlying data, associated maps (as necessary), and the specific protocols used to develop the FCIs, will be presented to USEPA in the *Habitat Assessment Reports* referenced in the HDA Work Plan.

II. Necessary Materials and Equipment

- Small boat with standard water safety gear (e.g., personal flotation device [PFD]; first aid kit)
- Protective gear for working in water (e.g., hip waders, wetsuit, drysuit)
- Foul weather gear
- Rapid Bioassessment Protocols (RBP) guidance document
- Differential Global positioning system (DGPS) unit
- Soil auger
- Inclinometer
- Video camera
- Survey measuring tape (100-meter [m] length is recommended)
- Erasable slate with pens
- Binoculars
- Field guide(s)
- Field log book

III. Sampling Design

As described in the HDA Work Plan, natural shoreline habitats will be delineated and mapped based on aerial photographs (primarily oblique photography), field groundtruthing, and, as appropriate for adjacent shallow river bottoms, side-scan sonar output and substrate characterization data from the Sediment Sampling and Analysis Program (SSAP). As a component of habitat delineation activities, this information will be integrated into a series of overlay habitat delineation maps. These maps will be used to identify a suite of sampling strata for the detailed assessment of natural shoreline habitats. Strata will be based on one or more key parameters relevant to shoreline habitats, such as substrate type, dominant vegetation, bank slope, adjacent land use, and others as appropriate.

River Sections 1, 2, and 3 together comprise about 40 river miles (64 kilometers), or 80 bank miles (128 bank kilometers) from the former Fort Edward Dam to the Federal Dam at Troy. From oblique aerial photography and subsequent groundtruthing, the entire 80 miles of bank habitat will be delineated and classified into habitat strata. However, only a portion of that overall bank habitat will be affected by remedial activities. According to the USEPA ROD Responsiveness Summary (ROD Part 3; Book 1 of 3, at page 4-29 and at page 10-23, USEPA, 2002), it appears that a total of approximately 17 miles of shoreline may be subject to remediation impacts (including both natural and maintained shorelines). The detailed functional habitat assessment activities will be conducted at representative sampling stations in natural shoreline habitats, with the goal of conducting such activities at an average distribution of approximately two stations per mile of potentially impacted river bank habitat (based on professional judgment), with a corresponding number of reference stations along non-impacted river banks. To achieve this goal, a total of 68 stations will be selected for the detailed functional assessment of natural shorelines. These stations will be selected, using the information from the habitat delineation maps, together with available information on areas to be dredged, so as to meet the following criteria:

1. Adequately characterize all the natural shoreline habitat strata identified from the habitat delineation information, as described above;

2. Include a roughly equivalent number of target stations (in dredge areas) and reference stations (in non-dredge areas); and

3. Be allocated among River Sections in rough proportion to the relative areas of natural shoreline habitats likely to be affected in each River Section.

At each station, three transects will be established and sampled to assess habitat characteristics of the natural shorelines. Thus, the overall sampling design will involve the sampling of 204 transects, with 102 in target areas and 102 in reference areas. The specific transect locations to be sampled will be selected to best characterize the shoreline strata within the station and based on the amount of dredging to be completed. Thus, an area of uniform natural shoreline or where limited dredging is planned will receive fewer sample points than an area of heterogeneous natural shoreline or where more extensive dredging is planned.

IV. Methods

The protocols described in this SOP for assessing river bank habitat are adapted from the USEPA RBPs (Barbour et al., 1999). Sampling will be conducted by trained, experienced personnel (per Barbour et al., 1999). Sample locations will not be disturbed by sampling personnel prior to making habitat parameter estimates.

Five methods will be used to assess shoreline habitats: A) videotape monitoring; B) shoreline substrate assessment; C) river bank assessment; D) riparian edge vegetation assessment; and E) limited wildlife observations. Each method will be implemented along pre-established transects. Videotape documentation will provide descriptive information on shoreline habitats. Substrate assessment, river bank assessment, and riparian edge vegetation assessment will provide quantitative habitat characterization information. The specific procedures for each method are described below.

Following the collection of oblique photographs (anticipated to be in July) and digitization, mapping and groundtruthing of the shoreline habitat, sampling will be conducted between June 1 and September 30 so that riparian edge vegetation can be identified and percent cover estimates determined. As stated in Section 2.1.3, adjacent areas will be qualitatively categorized into different landscapes (e.g.,

agricultural land, grassland, floodplain, forested, emergent wetland, etc.) and the width of the riparian zone will be determined to the extent allowed by the photography.

A. Videotape Monitoring Protocol

1. Locate transect position as determined from station location distribution described in Section III. Start offshore, in shallow water, approximately 3.0 m from the shoreline (it may be necessary to locate this position from a boat in areas where the riverbed is steeply sloped). Record precise transect location with DGPS.

2. Have one person remain at the point recorded in Step 1. Direct second person to walk perpendicular to shore with zero end of surveyor's tape. Advance to the top of the river bank slope, or 2.0 meters from the water's edge (whichever is a shorter distance). Have second person record location with DGPS. Have first person record length.

3. Starting from shallow water, position videotape downstream. Write transect number, date, and "downstream" on erasable slate. Record information on slate, remove from camera view, and proceed along transect from shallow water to riparian edge. Keep camera view positioned downstream throughout transect. End recording.

4. Repeat Step 3 (replacing the term "downstream" with "upstream") for upstream recording.

5. End videotaping.

B. Shoreline Substrate Assessment Protocol

1. At each transect, establish position at shoreline (e.g., edge of water line) and record location in field notebook (distance from riparian edge DGPS location).

2. As described by Barbour et al. (1999), visually observe the river surface substrate in an area from approximately 3.0 m offshore (this distance may be less in areas where the riverbed is steeply sloped) to the river bank "slope," or where terrestrial vegetation begins to cover the substrate. Use Table C-2 to record the approximate percent composition of inorganic features of the shoreline substrate in the inspected area determined by visual/tactile observation.

Table C-2. Inorganic Shoreline Substrate Components

Substrate Type	Diameter (millimeters [mm])	Percent Composition (0-100%)
Bedrock		
Boulder	> 256 mm (10 inches)	
Cobble	64 – 256 mm (2.5 – 10 inches)	
Gravel	2 – 64 mm (0.1 – 2.5 inches)	
Sand	0.06 – 2 mm (gritty)	
Silt	0.004-0.06 mm	
Clay	<0.004 mm (slick)	

(Adapted from Barbour et al., 1999)

3. As described by Barbour et al. (1999), use Table C-3 to record the percent composition of organic features of the shoreline substrate in the same visually inspected area as noted in Step 2.

Table C-3. Organic Shoreline Substrate Components		
Substrate Type	**Characteristic**	**Percent Composition (0-100%)**
Detritus	Sticks, wood, course plant material (CPOM)	
Muck-Mud	Black, very fine organic (FPOM)	
Marl	Grey, shell fragments	
Vegetated	Submerged or emergent vegetation present	

(Adapted from Barbour et al., 1999)
Note: Values are recorded visually and are therefore approximations

4. As modified from Barbour et al., (1999), record the estimated length and width of large woody debris formations in direct contact with the water surface within 50 meters on either side of the transect line. Individual limbs or logs are included if their diameter is 10 cm or greater. Multiply the length and width of the formations to obtain an estimate of downfall/m^2 (area sampled).

5. Repeat observations at one sampling point per station using different crew member and compare observations. Stations where repeated observations deviate from original estimates by 20% or more will be reassessed.

C. River Bank Assessment Protocol

1. At each transect, establish position in transect at base of river bank. Record location in field notebook (distance from riparian edge DGPS location). The river bank starts where a sharp rise in slope from the shoreline is obvious, or where terrestrial vegetation begins to cover the substrate.

2. Record relative slope of bank (using inclinometer or survey data if available).

3. As described by Barbour et al. (1999), estimate the percent of bank erosion by visual observation of freshly exposed substrate and unvegetated soils and sediments and use Table C-4 to determine and record estimated stability.

Table C-4. Bank Assessment Components	
Stability	**Percent Bank Erosion**
Stable – banks stable; evidence of erosion or bank failure absent or minimal	< 5%
Moderately Stable – infrequent small areas of erosion mostly healed	5 - 30%
Moderately Unstable – areas of erosion present, unhealed	30 – 60%
Unstable – eroded areas frequent along straight sections obvious bank sloughing	60 – 100%

(Adapted from Barbour et al., 1999)

4. As described by Barbour et al. (1999), visually estimate the amount of vegetative protection afforded to the river bank. Use Table C-5 to record the percent of the river bank covered by vegetation.

Table C-5. Bank Vegetative Components

Vegetative Protection	Percent River Bank Covered by Vegetation
Optimal – river bank surfaces and immediate riparian zones covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption minimal	> 90%
Suboptimal – river bank surfaces covered by native vegetation but one class of plants not well-represented; disruption evident but not affecting full plant growth potential	70 – 90%
Marginal – vegetative disruption evident; patches of bare soil or closely cropped vegetation common	50-70%
Poor – vegetative disruption is very high; vegetation has been removed to 5 cm or less in average height	< 50%

(Adapted from Barbour et al., 1999)

5. Repeat observations at one sampling point per station using different crew member and compare observations. Stations where repeated observations deviate from original estimates by 20% or more will be reassessed.

D. Riparian Edge Vegetation Assessment Protocol

1. Establish position along each transect at riparian edge. The riparian edge is defined, for purposes of the Remedial Design Work Plan, the area at the top of the river bank or 2.0 meters from the water's edge (whichever is a shorter distance). Note this location has been recorded in DGPS (see part A, *Videotape Monitoring*) and the width of the riparian edge was determined from aerial photography. Qualitatively record the adjacent land use based on visual inspection.

2. Visually estimate percent cover for canopy, understory, and herbaceous layer at the riparian edge. Ground-truth riparian edge as defined by aerial photographs. Use Table C-6 to record percent cover and dominant species composition for each layer.

3. Repeat observations at one sampling point per station using different crew member and compare observations. Stations where repeated observations deviate from original estimates by 20% or more will be reassessed.

Table C-6. Riparian Edge – Cover Components		
Vegetation Biome	**Percent Cover (0-100%)**	**Dominant Species Composition**
Canopy		
Understory		
Herbaceous		

E. Wildlife Observations

1. When on station, qualified personnel shall survey the surrounding natural shoreline to document the occurrence or signs of wildlife species (e.g., small mammals, birds) on or along those shorelines.

2. Record observations, including a qualitative narrative synopsis, on Table E-1 provided in Attachment E to the HDA Work Plan.

F. Development of FCIs

As described in Section I, the specific habitat parameter results described above will be used to develop FCIs for each function listed in Table C-1 (above) and each station sampled. The FCIs for the wildlife habitat function may consist of HSIs for representative indicator species. The approach to be used to develop the FCIs will follow the same general approach used by Ainslie et al. (1999) and Findlay et al. (2002) and/or, for wildlife habitat, may use pre-existing HSI models. HSI information for selected indicator species will be obtained from http://www.nwrc.usgs.gov/wdb/pub/hsi/hsiindex.htm. Preliminary FCI models and the lists of species for which HSIs will be calculated will be provided in the *Habitat Delineation Report.* The specific methods used will be described, together with the underlying data and the FCI results, in the *Habitat Assessment Reports* referenced in the HDA Work Plan.

V. References

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Appendix D

Standard Operating Procedure for Fringing Wetland Assessment (reprinted from the HDA Work Plan)

BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

Appendix D - Standard Operating Procedure for Fringing Wetland Assessment

I. Objective

The objective of this Standard Operating Procedure (SOP) is to set forth methods to measure the range of existing conditions of fringing wetland habitats in River Sections 1, 2, and 3 of the Upper Hudson River. The assessment activities that will be performed are described generally in Section 2.2.4 of the *Habitat Delineation and Assessment Work Plan* (HDA Work Plan; Blasland, Bouck & Lee, Inc. [BBL], 2003). This SOP provides a methodology for collecting information to document the range of conditions in the fringing wetland habitats, using techniques that are adapted from, and combine elements of, the hydrogeomorphic (HGM) assessment methods (Ainslie et al., 1999; Smith and Wakely, 2001; Findlay et al., 2002) and biological measurement techniques (Stevenson and Hauer, 2002; United States Environmental Protection Agency [USEPA], 2002a).

The approach to conducting the wetland functional assessments is based on the understanding that wetland structure and function are intrinsically linked (Niedowski, 2000). In general, when suitable habitat structure exists, biological communities and associated ecosystem functions are present. Measurements described in this SOP are based on characteristics of habitat structure. The approach described in this SOP is consistent with the Record of Decision (ROD) (USEPA, 2002b) and previous studies that have shown that successful fluvial replacement and reconstruction projects depend mainly on the presence of suitable physical habitat (e.g., Gore, 1985). Although the approach in the ROD (Responsiveness Summary, page 9-33) is specific to river bottoms, an adaptation of this approach is both applicable and relevant to wetlands.

The functions to be assessed for the fringing wetlands habitats, the specific measurements to be taken in the field to quantify those functions, and a brief rationale for those measurements are shown in Table D-1. The measurements will be used to develop functional capacity indices (FCIs) for the fringing wetland functions, so as to allow for management decisions regarding reallocation of functions among the replaced and reconstructed habitats, if necessary. FCIs are values calculated from field habitat measurements that provide a synthesis of information for evaluating habitat functions—in this case, the functions listed in Table D-1. FCIs provide a site-specific basis for describing the functional capacity of a habitat at a specific location, and for comparing functional capacity among locations. Development and application of FCIs in riverine wetlands is discussed generally in Ainslie et al. (1999) and Smith and Wakely (2001). A specific application of FCIs for riverine wetlands in the Lower Hudson River is available in Findlay et al. (2002). The development and application of FCIs for fringing wetlands in the Upper Hudson River will be analogous to the approach of Findlay et al. (2002). However, for the wildlife habitat function, pre-existing Habitat Suitability Indices (HSIs) for specific representative indicator species may be used in addition to or in lieu of other FCIs.

Table D-1. Wetlands		
Function	**Measured Variable**	**Rationale**
Energy Dissipation	Wetland area Percent wetland edge altered Slope Stem density Stem thickness Stem length Above-ground biomass	Larger wetlands extend along longer shoreline Intact wetlands buffer wave/current energy better Low slope relates to less reflected energy Stems dampen wave/current energy Sturdier plants withstand stronger flows Taller plants protect during higher flows Standing stock (or bulk) of material baffling energy
Surface-Water Exchange	Wetland area Presence/fluctuating water table Slope	Indicates size of surface – water interface Indicates potential for infiltration to occur Lower slope relates to longer residence time
Primary Production	Wetland area Above-ground biomass	Areal extent of productivity Shoot biomass surrogate for productivity
Nutrient Cycling	Above-ground biomass O Horizon - percent cover A Horizon - percent cover	Represents total mass of living organic matter available to enter nutrient cycle Recognizable dead organic matter and associated decomposers Unrecognizable dead organic matter entering nutrient cycle. Combined with "O" horizon, indicates nutrients are being recycled.
Remove and Hold Elements/Compounds	Clay content Redoximorphic features O Horizon - percent cover A Horizon - percent cover	Clay particles have more binding sites for holding elements Indicates that denitrification has occurred Organic matter available for holding elements / compounds Combined with "O" horizon, indicates organic matter available for holding elements / compounds
Export Organic Carbon	O Horizon - percent cover	Organic material in surface soil layer that can be readily exported
Maintain Character Plant Community	Plant species composition Stem density Above-ground biomass	Diverse communities more "stable" Related to area open for colonization Indicates relative productivity
Wildlife Habitat (Habitat suitability)	Wetland area Area of buffer Contiguous with other habitats (percent) Plant species composition Stem density Above-ground biomass	Larger areas support larger communities Allows greater isolation of wetland interior Connectivity; emigration; increased foraging opportunities Diverse plant communities can support higher diversity of wildlife Cover, protection from predation Related to primary productivity (food resources)

FCIs will be developed for each function listed in Table D-1 and for each wetland sampled (as described in Section III below). These FCIs, together with the underlying data, associated maps (as necessary), and the specific protocols used to develop the FCIs, will be presented to USEPA in the *Habitat Assessment Reports* referenced in the HDA Work Plan.

II. Necessary Field Materials and Equipment

- Small boat with standard water safety equipment (e.g., personal flotation device [PFD]; first aid kit)
- Foul weather gear
- Chest waders
- Differential Global Positioning System (DGPS) unit
- Soil probe/sharpshooter shovel
- Survey measuring tape
- Diameter tape or calipers for measuring tree diameter at breast height (dbh)
- Stakes and flagging
- Measuring tape (metric, 100 meter [m])
- Plant identification keys
- Munsell color book and hydric soil indicator list
- Sampling quadrats (0.25 square meter [m^2])
- Random number table
- Sealable storage bags, prelabeled
- Laboratory support equipment (e.g., jars, labels, etc.)
- Field log book
- Camera
- Binoculars
- Field guide(s)

III. Sampling Design

As described in the HDA Work Plan, fringing wetland habitats (and backwater wetlands to the extent allowed by the aerial photography) will be identified and mapped based on aerial photographs (including oblique photography), groundtruthing, and existing documentation. Wetlands will be delineated in accordance with the U.S. Army Corps of Engineers *Wetland Delineation Manual* (USACE, 1987). As part of the habitat delineation activities, the information from the aerial photographs and other delineation activities will be integrated into a series of overlay habitat delineation maps. These maps will be used to identify a suite of sampling strata for the detailed fringing wetland assessment activities. These strata will be based on one or more key wetland parameters, such as dominant vegetation, wetland parcel size, and others as appropriate.

Detailed functional assessments will be conducted in representative fringing wetlands greater than 250 square meters (0.06 acre) in areas that are located such that they could be directly affected by remediation activities and in comparable reference wetlands. Sufficient wetlands will be assessed to adequately characterize the functional conditions within wetlands representing each stratum identified during delineation activities.

Findlay et al. (2002) provide a useful model on which to base a sampling design for functional assessment of Upper Hudson River fringing wetlands. In their study of Lower Hudson River wetlands, Findlay et al. assessed wetlands in one hydrogeomorphic class (riverine) and three subclasses (sheltered,

fringing, and enclosed). In each subclass, they assessed five wetlands (chosen to reflect the widest possible range of functions), for a total of 15 stations. At each station, they sampled three transects of five quadrats each.

For the Upper Hudson River, fringing wetlands (a single subclass in the riverine hydrogeomorphic class) are subject to direct potential impacts associated with remediation. Thus, by analogy to Findlay et al. (2002), five stations will be selected within this subclass, such that five fringing wetlands greater than 250 square meters in size in areas that will potentially be impacted by remedial activities will be assessed. These wetlands will be selected (from the fringing wetlands identified and delineated during habitat delineation activities) so as to reflect the broadest range of functions (within that hydrogeomorphic class of wetlands) and so as to adequately characterize the wetland habitat strata identified from the delineation information (as described above). In addition, five fringing wetlands of generally similar size and range of functions will be selected in areas that are not adjacent to potentially impacted areas (reference wetlands). In the event that other wetlands from other subclasses (e.g., sheltered) are identified as being directly impacted by the remediation activities, those wetlands will be evaluated consistent with the current sampling design for fringing wetlands.

Within each wetland, three transects will be established for appropriate measurements, and along each transect, three quadrats will be located for sampling of appropriate parameters. Three quadrats will be used, rather than five as used by Findlay et al. (2002), because: 1)fringing wetlands in the Upper Hudson are smaller than those in the Lower Hudson; and 2) the quadrats used by Findlay et al (2002) were $0.25m^2$, whereas the quadrats specified herein are $1.0m^2$ for most measurements.

Thus, the wetland sampling design includes 10 individual fringing wetlands (five from potential dredging impact areas and five from reference areas), to be characterized by sampling conducted along three transects each (as appropriate), with three quadrats sampled (for appropriate parameters) along each transect. The total number of transects sampled will be 30, and the total number of quadrats will be 90. Sampling stations will be allocated among River Sections in a rough proportion to the relative areas of wetland habitat adjacent to dredging locations in each River Section. This design is in keeping with the methods and findings of Findlay et al. (2002) for a generally similar investigation on the Lower Hudson River, with the design modified to fit the site-specific conditions of the Upper Hudson River assessment.

IV. Methods

The following procedures describe the steps for conducting functional assessments of fringing riverine wetlands along the Upper Hudson River. These procedures are modified from, and combine elements of, HGM assessment methods (Ainslie et al., 1999; Findlay et al., 2002) and biological measurement techniques for wetlands (Stevenson and Hauer, 2002; USEPA, 2002a). Data and observations for Items A-E will be obtained from the wetland as a whole. Data and observations for Items F and G will be obtained from transects within each wetland. Data and observations for Items H-N will be obtained from sampling quadrats randomly placed on each transect. Data and observations for Item O will be obtained from the wetland as a whole. DGPS will be used to record positions of transects and quadrats within sample stations of fringing wetlands. If it is determined that no sediment samples are to be collected from within the potentially impacted wetlands by the completion of the SSAP program, sediment samples will be collected from a subset of wetland sampling locations for determination of grain size, TOC, and nutrient content as necessary to adequately characterize the wetlands.

Following the collection of aerial photographs (anticipated to be in July) and digitization, mapping and groundtruthing, fringing wetland habitat will be evaluated during or after peak growing season (July 1 to

September 15). The procedures for evaluating the function of fringing wetlands consist of the following steps:

A. Wetland Parcel Size

Measure/Units:
The area of wetland.

Method:
1. Determine the area of the parcel using field reconnaissance, topographic maps, National Wetland Inventory maps (NWI), and/or aerial photography.
2. Report the size of the wetland tract in square meters.

B. Interior Core Area

Measure/Units:
The percent of the wetland parcel with a buffer zone greater than 100 m separating it from non-forested habitat.

Method:
1. Visually determine the area of the wetland tract within a buffer of at least 100 m (i.e., at least 100 m from wetland perimeter) using field reconnaissance, topographic maps, NWI maps, aerial photography, and/or other sources.
2. Report the size of the area within a 100-m buffer as a percentage of total parcel area.

C. Habitat Connections

Measure/Units:
The percent of the perimeter of the wetland parcel that is contiguous with other natural habitats.

Method:
1. Determine the total length of the wetland perimeter using field reconnaissance, topographic maps, and/or aerial photography.
2. Visually determine the length of the wetland perimeter that is contiguous with other natural (vs. maintained or anthropogenic) habitats including other wetlands (fringing and floodplain), wooded or forested riparian tracts, or other vegetated open space.
3. Report as a visual estimate, the percent of the perimeter of the wetland tract that is "connected" (i.e., contiguous to other natural habitats).

D. Soil Integrity

Measure/Units:
The percent of the fringing wetland with soils that appear to have been altered or disturbed by anthropogenic impacts.

Method:
1. Visually determine (from historical aerials and site reconnaissance) if any of the soils in the area being assessed appear to have been altered. In particular, look for alteration to a normal soil profile -- for example, absence of an "A" horizon (defined below), presence of fill material, or

other types of impact that significantly alter soil integrity. Use soil probe or sharpshooter shovel, as appropriate, to obtain sample.
2. Report the percent of the wetland with altered or disturbed soils.

E. Surface Water Connections

Measure/Units:
The percent of the linear length of shoreward bank and riverward edge of the wetland parcel that has been altered to prevent exchange of surface water in or out of wetland.

Method:
1. Conduct a visual reconnaissance of the parcel and the adjacent shoreward bank and riverward edge. Estimate what percent of the length of each that is modified with levees, side cast materials, or other obstructions that reduce the exchange of surface water between the river channel, the wetland, and the floodplain/riparian corridor.
2. Report percent of the linear distance of the bank and riverward edge that has been altered.

F. Elevation

Measure/Units:
The elevation of the shoreward and riverward edges of the wetland parcel.

Method:
1. Randomly select three transect locations along the axis of the wetland parallel to the shoreline. Establish a transect line perpendicular to the long axis at each location.
2. At each transect, locate the shoreward edge of the fringing wetland. Use DGPS to record elevation and position.
3. At each transect, locate the riverward edge of the fringing wetland. Use DGPS to record elevation and position. Report the elevation in feet and inches. Report distance between shoreward and riverward positions.

G. Soil Clay Content

Measure/Units:
The clay content in the top 20 inches (50.8 cm) of the soil profile of the wetland.

Method:
1. Visually determine if the native soil along the transects has been covered with fill material, excavated and replaced, or subjected to any other types of impact that significantly change the clay content of the top 20 inches (50.8 cm) of the soil profile. Use soil probe or sharpshooter shovel, as necessary, to obtain a sample. If no such alterations have occurred, assign a value of 1.
2. If the soils along the transects have been altered in one of the ways described above, estimate the soil texture for each soil horizon in the upper 20 inches (50.8 cm) in representative portions of these areas from field texture determinations done by hand.
3. Based on the soil texture class determined in the previous step, the percentage of clay is determined from the soil texture triangle. The soil texture triangle contains soil texture classes and the corresponding percentages of sand, silt, and clay that comprise each class. Once the soil texture is determined by feel, the corresponding clay percentage is read from the left side of the soil texture triangle. The median value from the range of percent clay is used to calculate the

weighted average. For example, if the soil texture at the surface were a silty clay loam, the range of clay present in that texture class is 28–40%. A median value of 34% would be used for the clay percentage in that particular horizon.

4. Calculate a weighted average of the percent clay in the altered soil by averaging the percent clay from each of the soil horizons to a depth of 20 inches (50.8 cm). For example, if the "A" horizon occurs from a depth of 0–5 inches (0–12.7 cm) and has 30% clay, and the underlying soil from a depth of 6–20 inches (15.2–50.8 cm) has 50% clay, then the weighted average of the percent clay for the top 20 inches (50.8 cm) of the profile is: [(5 × 30) + (15 × 50)] / 20 = 45%.
5. Calculate the difference in percent clay between the natural soil (i.e., what existed prior to the impact obtained from soil survey or reference wetland data) and the altered soil using the following formula: percent difference = (|% clay after alteration - % clay before alteration |) / % clay before alteration). For example, if the percent clay after alteration is 40%, and the percent clay before alteration is 70%, then | 40 - 70 | = 30, and (30 / 70) = 43%.
6. Average the results of the three transects.
7. Multiply the percent difference for the altered area (i.e., the value obtained in the previous step) by the percent of the wetland that the transect area represents (based on visual estimate).
8. Multiply the result by 100 to obtain the percent difference. Report the percent difference in the soil clay content in the area being assessed.
9. On one transect per station, repeat measurements and record separately for reference to measurement variability.

H. Redoximorphic Features and Fluctuating Water Table

Measure/Units:

The presence or absence of redoximorphic features in each sampling quadrat. The presence of a fluctuating water table.

Method:

1. Place 0.25 m^2 quadrats at three locations selected randomly along each transect (quadrats will be placed and sampled sequentially—all need not be placed simultaneously).
2. Visually inspect the top 20 inches (50.8 cm) of the soil profile and determine if redoximorphic features (Verpraskas, 1994), accumulation or organic matter, or other hydric soil indicators are present or absent.
3. Report redoximorphic features as present or absent.
4. To determine the presence of a fluctuating water table, visually inspect the top 20 inches (50.8 cm) of the soil profile for the presence redoximorphic features or a reduced soil matrix (e.g. presence of mottling, low chroma colors, change in chroma hue or color when exposed to air) (USDA, NRCS, 2002).
5. Report fluctuating water table as present or absent.

I. "O" Horizon Cover

Measure/Units:

Percent cover of the "O" horizon (defined as surface layer formed above the mineral layer and composed of fresh or partially decomposed organic material).

Method:

1. Visually estimate the percent of the ground surface that is covered by an "O" horizon (defined above) in each sampling quadrat.

2. Average the results from the quadrats and report "O" horizon cover as a percent.

J. "A" Horizon Cover

Measure/Units:
Percent cover of the "A" horizon (defined as the upper mineral layer composed of organic material mixed with mineral matter, generally the darkest layer in a soil profile).

Method:
1. Estimate the percent of the mineral soil within the top 15 cm (6 inches) of the ground surface that qualifies as an "A" horizon (defined above) by making three soil observations in each sampling quadrat.
2. Average the results from the observations in the quadrat.
3. Report "A" horizon cover as a percent.

K. Plant Species Composition

Measure/Units:
Percent occurrence of dominant species in each relevant vegetative stratum.

Method:
1. Identify the dominant species in the canopy, understory vegetation, emergent layer (the primary and often the only stratum present in the fringing wetlands of the Upper Hudson) and ground vegetation strata using the 50/20 rule (described below). Use tree basal area to determine abundance in the canopy strata, understory vegetation density to determine abundance in the understory strata, emergent vegetation density to determine abundance in the emergent layer, and ground vegetation cover to determine abundance in the ground vegetation strata. To apply the 50/20 rule, rank species from each stratum in descending order of abundance. Identify dominants by summing the normalized abundance measure beginning with the most abundant species in descending order until 50% is exceeded. Additional species with ≥ 20% normalized abundance are also considered dominants.
2. Report percent occurrence of dominant species in all vegetation strata.

L. Invasive Species

Measure/Units:
Percent occurrence of nonnative or invasive species in each relevant vegetative stratum.

Method:
1. Identify any invasive or nonnative species in the canopy, understory vegetation, emergent layer (the primary and often the only stratum present in the fringing wetlands of the Upper Hudson) and ground vegetation strata. Visually estimate the percent of quadrat covered by invasive/nonnative species.
2. Report percent occurrence of invasive/nonnative species in all vegetation strata.
3. For one quadrat per station, repeat measurements and record separately for evaluating measurement variability.

M. Emergent Plant Conformation and Stem Density

Measure/Units:
Stem conformation (length and thickness) and spatial density (stems per unit area) of emergent wetland vegetation.

Method:
1. In each quadrat on each transect, count all stems of dominant emergent macrovegetation. Record density of live and dead stems. In one quadrat per station, repeat count and record separately for reference to measurement variability.
2. From each quadrat, randomly select 10 stems of the dominant species. Measure the maximum total length of each stem to the nearest 0.1 cm. Measure diameter to the nearest 0.01 cm at the thickest part of the stem with calipers. In one quadrat per station, repeat measurements and record separately for reference to measurement variability.
3. Report live and dead stem density per unit area and minimum, maximum and average stem height, thickness, and thickness:height ratio (robustness).

N. Emergent Plant Biomass

Measure/Units:
Biomass per unit area of emergent wetland vegetation

Method:
1. From the same quadrats used in M (above), clip all standing vegetation from within each quadrat after conducting conformation and density measurements. Place in a large plastic bag for return to the processing laboratory.
2. At the processing laboratory, separate live from dead stems. Dry separately to constant weight and record weight. For one quadrat per station, repeat the drying and weighing process and record separately for reference to measurement variability. Drying procedure is as follows:

    a. Clean and dry glass 1 liter (L) beakers to be used for drying the samples.
    b. Determine and record the tare weight of each beaker using precision scale. Mass should be recorded to the nearest $1/100^{th}$ of a gram.
    c. Use scale to record the initial mass of the sample in the beaker before beginning the drying procedure.
    d. Place the samples in the laboratory oven for 24 hours at 85 (+/- 1) °C. Confirm that the oven is connected to ventilation system through use of flexible ductwork.
    e. Remove samples at the end of 24 hours and place in the desiccator for approximately 45 minutes to confirm the complete removal of water from the samples and to allow for cooling of the sample to room temperature.
    f. Record the mass of the samples immediately after removal from the desiccator.
    g. Return the samples to the oven for 1 hour, place in desiccator and record the mass for constant mass reading (within 5% of the previous measurement).
    h. Repeat Step G until constant mass is reached.
    i. Place samples in sealed bags for archiving and store at room temperature.

O. Wildlife Observations

Measure/Units:
Presence of animal species in wetland habitat being assessed.

Method:
1. When on station, qualified personnel shall survey the wetland being assessed to document the occurrence and signs of wildlife species (e.g., wading birds, small mammals, amphibians, reptiles) using that wetland.
2. Record observations, including a qualitative narrative synopsis, on Table E-1 provided in Attachment E to the HDA Work Plan.

P. Development of FCIs

As discussed in Section I, the specific measurements described above will be used to develop FCIs for each function listed in Table D-1 (above) and each wetland sampled. The FCIs for the wildlife habitat function may include HSIs for representative indicator species. The methods to be used to develop the FCIs will follow the general approach used by Ainslie et al. (1999) and Findlay et al. (2002), with the possible additional use of pre-existing HSI models for the wildlife habitat function. HSI information for selected indicator species will be obtained from http://www.nwrc.usgs.gov/wdb/pub/hsi/hsiindex.htm. Preliminary FCI models and the lists of species for which HSIs will be calculated will be provided in the *Habitat Delineation Report.* The specific methods used will be described, together with the underlying data and the FCI results, in the *Habitat Assessment Reports* referenced in the HDA Work Plan.

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Appendix E

Fish and Wildlife Survey Form (reprinted from the HDA Work Plan)

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Appendix E – Fish and Wildlife Survey Form

Fish and Wildlife Survey Form

Date (mm/dd/yyyy): _____/_____/_____ **Page ___ of ___**

Time: _____ **Weather Conditions: _____**

Species Name	Number Obs.	Sight Code	Sign Code	Observer's Initials	Habitat Type / Location (approximate)

Instructions:

- Enter species common name in column 1 and number observed in column 2
- Select appropriate "sight" or "sign" codes from below and enter into designated boxes
- Enter initials of Observer
- Enter habitat where species was observed and approximate location in river
- Note exotic species if observed

	Sight Codes:		**Sign Codes:**		
FG	foraging	**SC**	scat	**CA**	call
FE	feeding	**SL**	slide	**NE**	nest
RS	resting, perching	**DHB**	den, hut, burrow	**TR**	tracks
CA	calling	**TR**	tracks	**FG**	browse
FL	flight	**DB**	day bed	____	other: _____
____	other: _____				

Narrative

Appendix F

Geographic Coordinates and Species for Assessment Stations

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Habitat Asessment Report for Candidate Phase 1 Areas

Appendix F - Geographic Coordinates and Species for Assessment Stations

Point ID	Northing	Easting	Species Observed
SAV-1-2003-Q1	1616361	733808	Wild Celery (*Vallisneria americana*)
			Redhead Grass (*Potamogeton perfoliatus*)
SAV-1-2003-Q2	1616494	734094	Wild Celery (*Vallisneria americana)*
			American Pondweed (*Potamogeton nodosus*)
SAV-1-2003-Q3	1616236	733613	Wild Celery (*Vallisneria americana*)
SAV-1-2003-Q4	1616195	733664	Wild Celery (*Vallisneria americana*)
			American Pondweed (*Potamogeton nodosus*)
SAV-1-2003-Q5	1616274	733688	Wild Celery (*Vallisneria americana*)
			Redhead Grass (*Potamogeton perfoliatus*)
			American Pondweed (*Potamogeton nodosus*)
SAV-1-2003-Q6	1616228	734053	Wild Celery (*Vallisneria americana*)
			American Pondweed (*Potamogeton nodosus*)
SAV-1-2003-Q7	1615757	734323	Wild Celery (*Vallisneria americana*)
SAV-1-2003-Q8	1615941	733890	Wild Celery (*Vallisneria americana*)
SAV-1-2003-Q9	1615919	734139	Wild Celery (*Vallisneria americana*)
SAV-2-2003-Q1	1614348	735177	Wild Celery (*Vallisneria americana*)
			Common Waterweed (*Elodea canadensis*)
SAV-2-2003-Q2	1614236	735220	Wild Celery (*Vallisneria americana*)
SAV-2-2003-Q3	1614124	735244	Wild Celery (*Vallisneria americana*)
SAV-2-2003-Q4	1614645	734822	Wild Celery (*Vallisneria americana*)
SAV-2-2003-Q5	1614085	735056	Wild Celery (*Vallisneria americana*)
SAV-2-2003-Q6	1614534	735097	American Pondweed (*Potamogeton nodosus*)
			Wild Celery (*Vallisneria americana*)
SAV-2-2003-Q7	1613813	735082	Wild Celery (*Vallisneria americana*)
SAV-2-2003-Q8	1614532	735083	American Pondweed (*Potamogeton nodosus*)
			Wild Celery (*Vallisneria americana*)
SAV-2-2003-Q9	1613838	735163	Wild Celery (*Vallisneria americana*)
SAV-3-2003-Q1	1615264	736022	Wild Celery (*Vallisneria americana*)
SAV-3-2003-Q2	1615127	735916	Wild Celery (*Vallisneria americana*)
SAV-3-2003-Q3	1615240	736048	Wild Celery (*Vallisneria americana*)
SAV-3-2003-Q4	1613163	736091	Wild Celery (*Vallisneria americana*)
			American Pondweed (*Potamogeton nodosus*)
SAV-3-2003-Q5	1613095	736020	Wild Celery (*Vallisneria americana*)
			Common Waterweed (*Elodea canadensis*)
SAV-3-2003-Q6	1612943	735881	Wild Celery (*Vallisneria americana*)
SAV-3-2003-Q7	1615067	736093	Wild Celery (*Vallisneria americana*)
SAV-3-2003-Q8	1615068	736083	Wild Celery (*Vallisneria americana*)
			Common Waterweed (*Elodea canadensis*)
SAV-3-2003-Q9	1614940	736160	Wild Celery (*Vallisneria americana*)
			Common Waterweed (*Elodea canadensis*)
SAV-4-2003-Q1	1610770	734241	Wild Celery (*Vallisneria americana*)
SAV-4-2003-Q2	1610806	734218	Wild Celery (*Vallisneria americana*)
SAV-4-2003-Q3	1610824	734266	Wild Celery (*Vallisneria americana*)
SAV-4-2003-Q4	1610642	734105	Wild Celery (*Vallisneria americana*)
SAV-4-2003-Q5	1610649	734096	Wild Celery (*Vallisneria americana*)
SAV-4-2003-Q6	1610140	733886	Wild Celery (*Vallisneria americana*)
SAV-4-2003-Q7	1610209	733885	Wild Celery (*Vallisneria americana*)
SAV-4-2003-Q8	1610303	733885	Wild Celery (*Vallisneria americana*)

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Appendix F - Geographic Coordinates and Species for Assessment Stations

Point ID	Northing	Easting	Species Observed
SAV-4-2003-Q9	1610366	733897	Wild Celery (*Vallisneria americana*)
			American Pondweed (*Potamogeton nodosus*)
SAV-5-2003-Q1	1599771	736739	Wild Celery (*Vallisneria americana*)
			Redhead Grass (*Potamogeton perfoliatus*)
SAV-5-2003-Q2	1599747	736753	Wild Celery (*Vallisneria americana*)
			Redhead Grass (*Potamogeton perfoliatus*)
SAV-5-2003-Q3	1599664	736818	Wild Celery (*Vallisneria americana*)
SAV-5-2003-Q4	1599762	736682	Wild Celery (*Vallisneria americana*)
SAV-5-2003-Q5	1599767	736716	Wild Celery (*Vallisneria americana*)
SAV-5-2003-Q6	1599540	736854	Wild Celery (*Vallisneria americana*)
SAV-5-2003-Q7	1599474	736903	Wild Celery (*Vallisneria americana*)
SAV-5-2003-Q8	1599459	736969	Wild Celery (*Vallisneria americana*)
SAV-5-2003-Q9	1599585	736938	Wild Celery (*Vallisneria americana*)
SAV-6-2003-Q1	1596239	737794	Wild Celery (*Vallisneria americana*)
SAV-6-2003-Q2	1596221	737773	Wild Celery (*Vallisneria americana*)
			Common Waterweed (*Elodea canadensis*)
SAV-6-2003-Q3	1596287	737779	Wild Celery (*Vallisneria americana*)
SAV-6-2003-Q4	1596004	737552	Common Waterweed (*Elodea canadensis*)
SAV-6-2003-Q5	1596037	737618	Wild Celery (*Vallisneria americana*)
SAV-6-2003-Q6	1596071	737600	Wild Celery (*Vallisneria americana*)
SAV-6-2003-Q7	1596125	737592	Wild Celery (*Vallisneria americana*)
SAV-6-2003-Q8	1596184	737564	Wild Celery (*Vallisneria americana*)
SAV-6-2003-Q9	1596268	737577	Wild Celery (*Vallisneria americana*)
			Common Waterweed (*Elodea canadensis*)
SAV-7-2003-Q1	1593754	736689	Wild Celery (*Vallisneria americana*)
			Grassy Pondweed (*Potamogeton gramineus*)
SAV-7-2003-Q2	1593629	736600	Wild Celery (*Vallisneria americana*)
			Common Waterweed (*Elodea canadensis*)
SAV-7-2003-Q3	1593389	736487	Wild Celery (*Vallisneria americana*)
SAV-7-2003-Q4	1593287	736460	Wild Celery (*Vallisneria americana*)
SAV-7-2003-Q5	1593389	736498	Wild Celery (*Vallisneria americana*)
SAV-7-2003-Q6	1593316	736461	Wild Celery (*Vallisneria americana*)
SAV-7-2003-Q7	1593162	736411	Wild Celery (*Vallisneria americana*)
SAV-7-2003-Q8	1593137	736420	Wild Celery (*Vallisneria americana*)
SAV-7-2003-Q9	1593051	736397	Wild Celery (*Vallisneria americana*)
SAV-8-2003-Q1	1565515	735810	American Pondweed (*Potamogeton nodosus*)
SAV-8-2003-Q2	1565542	735825	Wild Celery (*Vallisneria americana*)
			American Pondweed (*Potamogeton nodosus*)
SAV-8-2003-Q3	1565597	735823	American Pondweed (*Potamogeton nodosus*)
SAV-8-2003-Q4	1565457	735829	Wild Celery (*Vallisneria americana*)
			Common Waterweed (*Elodea canadensis*)
SAV-8-2003-Q5	1565486	735836	Wild Celery (*Vallisneria americana*)
			Common Waterweed (*Elodea canadensis*)
SAV-8-2003-Q6	1565525	735852	Wild Celery (*Vallisneria americana*)
SAV-8-2003-Q7	1565825	736277	Wild Celery (*Vallisneria americana*)
			Common Waterweed (*Elodea canadensis*)
SAV-8-2003-Q8	1565807	736263	Wild Celery (*Vallisneria americana*)
SAV-8-2003-Q9	1565703	736327	Wild Celery (*Vallisneria americana*)
			Common Waterweed (*Elodea canadensis*)

Appendix F - Geographic Coordinates and Species for Assessment Stations

Point ID	Northing	Easting	Species Observed
SAV-9-2003-Q1	1566674	734874	Wild Celery (*Vallisneria americana*)
SAV-9-2003-Q2	1566693	734912	Wild Celery (*Vallisneria americana*)
SAV-9-2003-Q3	1566717	734905	Wild Celery (*Vallisneria americana*)
SAV-9-2003-Q4	1567020	735316	Wild Celery (*Vallisneria americana*)
SAV-9-2003-Q5	1566986	735383	Wild Celery (*Vallisneria americana*)
SAV-9-2003-Q6	1566783	735441	Wild Celery (*Vallisneria americana*)
SAV-9-2003-Q7	1567828	735272	Wild Celery (*Vallisneria americana*)
SAV-9-2003-Q8	1567854	735239	Wild Celery (*Vallisneria americana*)
SAV-9-2003-Q9	1567918	735218	Wild Celery (*Vallisneria americana*)
WET-01-2003-DN	1589661	736293	Common Arrowhead (*Sagittaria latifolia*)
			Pickerel Weed (*Pontederia cordata*)
			Rice Cut Grass (*Leersia oryzoides*)
			Reed Canary Grass (*Phalaris arundinacea*)
			Purple Loosestrife (*Lythrum salicaria*)
			Great Bur Reed (*Sparganium eurycarpum*)
WET-01-2003-IN1	1589974	736367	Common Arrowhead (*Sagittaria latifolia*)
			Pickerel Weed (*Pontederia cordata*)
			Rice Cut Grass (*Leersia oryzoides*)
			Reed Canary Grass (*Phalaris arundinacea*)
			Purple Loosestrife (*Lythrum salicaria*)
			Great Bur Reed (*Sparganium eurycarpum*)
WET-01-2003-IN2	1589800	736331	Common Arrowhead (*Sagittaria latifolia*)
			Pickerel Weed (*Pontederia cordata*)
			Rice Cut Grass (*Leersia oryzoides*)
			Reed Canary Grass (*Phalaris arundinacea*)
			Purple Loosestrife (*Lythrum salicaria*)
			Great Bur Reed (*Sparganium eurycarpum*)
WET-01-2003-OFF1	1589976	736337	Common Arrowhead (*Sagittaria latifolia*)
			Pickerel Weed (*Pontederia cordata*)
			Rice Cut Grass (*Leersia oryzoides*)
			Reed Canary Grass (*Phalaris arundinacea*)
			Purple Loosestrife (*Lythrum salicaria*)
			Great Bur Reed (*Sparganium eurycarpum*)
WET-01-2003-OFF2	1589807	736308	Common Arrowhead (*Sagittaria latifolia*)
			Pickerel Weed (*Pontederia cordata*)
			Rice Cut Grass (*Leersia oryzoides*)
			Reed Canary Grass (*Phalaris arundinacea*)
			Purple Loosestrife (*Lythrum salicaria*)
			Great Bur Reed (*Sparganium eurycarpum*)
WET-01-2003-Q1	1589948	736352	Common Arrowhead (*Sagittaria latifolia*)
			Pickerel Weed (*Pontederia cordata*)
			Rice Cut Grass (*Leersia oryzoides*)
			Reed Canary Grass (*Phalaris arundinacea*)
			Purple Loosestrife (*Lythrum salicaria*)
			Wild Rice (*Zizania aquatica*)
			Great Bur Reed (*Sparganium eurycarpum*)

Appendix F - Geographic Coordinates and Species for Assessment Stations

Point ID	Northing	Easting	Species Observed
WET-01-2003-Q2	1589942	736347	Common Arrowhead (*Sagittaria latifolia*)
			Pickerel Weed (*Pontederia cordata*)
			Rice Cut Grass (*Leersia oryzoides*)
			Reed Canary Grass (*Phalaris arundinacea*)
			Purple Loosestrife (*Lythrum salicaria*)
			Wild Rice (*Zizania aquatica*)
			Great Bur Reed (*Sparganium eurycarpum*)
WET-01-2003-Q3	1589880	736333	Common Arrowhead (*Sagittaria latifolia*)
			Pickerel Weed (*Pontederia cordata*)
			Rice Cut Grass (*Leersia oryzoides*)
			Reed Canary Grass (*Phalaris arundinacea*)
			Purple Loosestrife (*Lythrum salicaria*)
			Wild Rice (*Zizania aquatica*)
			Great Bur Reed (*Sparganium eurycarpum*)
WET-01-2003-Q4	1589824	736317	Common Arrowhead (*Sagittaria latifolia*)
			Pickerel Weed (*Pontederia cordata*)
			Rice Cut Grass (*Leersia oryzoides*)
			Reed Canary Grass (*Phalaris arundinacea*)
			Purple Loosestrife (*Lythrum salicaria*)
			Great Bur Reed (*Sparganium eurycarpum*)
WET-01-2003-Q5	1589887	736334	Common Arrowhead (*Sagittaria latifolia*)
			Pickerel Weed (*Pontederia cordata*)
			Rice Cut Grass (*Leersia oryzoides*)
			Reed Canary Grass (*Phalaris arundinacea*)
			Wild Rice (*Zizania aquatica*)
			Walter Millet (*Echinochola walteri*)
			Purple Loosestrife (*Lythrum salicaria*)
			Great Bur Reed (*Sparganium eurycarpum*)
WET-01-2003-Q6	1589767	736316	Common Arrowhead (*Sagittaria latifolia*)
			Pickerel Weed (*Pontederia cordata*)
			Rice Cut Grass (*Leersia oryzoides*)
			Reed Canary Grass (*Phalaris arundinacea*)
			Sessile Fruited Arrowhead (*Sagittaria rigida*)
			Wild Rice (*Zizania aquatica*)
			Purple Loosestrife (*Lythrum salicaria*)
			Great Bur Reed (*Sparganium eurycarpum*)
WET-01-2003-Q7	1589742	736313	Common Arrowhead (*Sagittaria latifolia*)
			Pickerel Weed (*Pontederia cordata*)
			Rice Cut Grass (*Leersia oryzoides*)
			Reed Canary Grass (*Phalaris arundinacea*)
			Wild Rice (*Zizania aquatica*)
			Purple Loosestrife (*Lythrum salicaria*)
			Great Bur Reed (*Sparganium eurycarpum*)

Appendix F - Geographic Coordinates and Species for Assessment Stations

Point ID	Northing	Easting	Species Observed
WET-01-2003-Q8	1589708	736304	Common Arrowhead (*Sagittaria latifolia*)
			Pickerel Weed (*Pontederia cordata*)
			Rice Cut Grass (*Leersia oryzoides*)
			Reed Canary Grass (*Phalaris arundinacea*)
			Wild Rice (*Zizania aquatica*)
			Purple Loosestrife (*Lythrum salicaria*)
			Great Bur Reed (*Sparganium eurycarpum*)
WET-01-2003-Q9	1589686	736298	Common Arrowhead (*Sagittaria latifolia*)
			Pickerel Weed (*Pontederia cordata*)
			Rice Cut Grass (*Leersia oryzoides*)
			Reed Canary Grass (*Phalaris arundinacea*)
			Wild Rice (*Zizania aquatica*)
			Purple Loosestrife (*Lythrum salicaria*)
			Great Bur Reed (*Sparganium eurycarpum*)
WET-01-2003-UP	1590087	736360	Common Arrowhead (*Sagittaria latifolia*)
			Pickerel Weed (*Pontederia cordata*)
			Rice Cut Grass (*Leersia oryzoides*)
			Reed Canary Grass (*Phalaris arundinacea*)
			Purple Loosestrife (*Lythrum salicaria*)
			Great Bur Reed (*Sparganium eurycarpum*)
WET-02-2003-DN	1603051	734767	Wild Rice (*Zizania aquatica*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Common Arrowhead (*Sagittaria latifolia*)
			Rice Cut Grass (*Leersia oryzoides*)
			Walter Millet (*Echinochola walteri*)
			Sessile Fruited Arrowhead (*Sagittaria rigida*)
WET-02-2003-IN1	1602839	734919	Wild Rice (*Zizania aquatica*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Common Arrowhead (*Sagittaria latifolia*)
			Rice Cut Grass (*Leersia oryzoides*)
			Walter Millet (*Echinochola walteri*)
			Sessile Fruited Arrowhead (*Sagittaria rigida*)
WET-02-2003-IN2	1602924	734856	Wild Rice (*Zizania aquatica*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Common Arrowhead (*Sagittaria latifolia*)
			Rice Cut Grass (*Leersia oryzoides*)
			Walter Millet (*Echinochola walteri*)
			Sessile Fruited Arrowhead (*Sagittaria rigida*)
WET-02-2003-OFF1	1602855	734944	Wild Rice (*Zizania aquatica*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Common Arrowhead (*Sagittaria latifolia*)
			Rice Cut Grass (*Leersia oryzoides*)
			Walter Millet (*Echinochola walteri*)
			Sessile Fruited Arrowhead (*Sagittaria rigida*)

Appendix F - Geographic Coordinates and Species for Assessment Stations

Point ID	Northing	Easting	Species Observed
WET-02-2003-OFF2	1602942	734880	Wild Rice (*Zizania aquatica*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Common Arrowhead (*Sagittaria latifolia*)
			Rice Cut Grass (*Leersia oryzoides*)
			Walter Millet (*Echinochola walteri*)
			Sessile Fruited Arrowhead (*Sagittaria rigida*)
WET-02-2003-Q1	1602810	734954	Wild Rice (*Zizania aquatica*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Common Arrowhead (*Sagittaria latifolia*)
			Rice Cut Grass (*Leersia oryzoides*)
			Pickerel Weed (*Pontederia cordata*)
			Walter Millet (*Echinochola walteri*)
			Sessile Fruited Arrowhead (*Sagittaria rigida*)
WET-02-2003-Q2	1602781	734977	Wild Rice (*Zizania aquatica*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Common Arrowhead (*Sagittaria latifolia*)
			Rice Cut Grass (*Leersia oryzoides*)
			Pickerel Weed (*Pontederia cordata*)
			Walter Millet (*Echinochola walteri*)
			Sessile Fruited Arrowhead (*Sagittaria rigida*)
WET-02-2003-Q3	1602769	734987	Wild Rice (*Zizania aquatica*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Common Arrowhead (*Sagittaria latifolia*)
			Rice Cut Grass (*Leersia oryzoides*)
			Pickerel Weed (*Pontederia cordata*)
			Walter Millet (*Echinochola walteri*)
			Sessile Fruited Arrowhead (*Sagittaria rigida*)
WET-02-2003-Q4	1602793	734958	Wild Rice (*Zizania aquatica*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Common Arrowhead (*Sagittaria latifolia*)
			Reed Canary Grass (*Phalaris arundinacea*)
			Rice Cut Grass (*Leersia oryzoides*)
			Walter Millet (*Echinochola walteri*)
			Sessile Fruited Arrowhead (*Sagittaria rigida*)
WET-02-2003-Q5	1602824	734941	Wild Rice (*Zizania aquatica*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Common Arrowhead (*Sagittaria latifolia*)
			Reed Canary Grass (*Phalaris arundinacea*)
			Purple Loosestrife (*Lythrum salicaria*)
			Rice Cut Grass (*Leersia oryzoides*)
			Walter Millet (*Echinochola walteri*)
			Sessile Fruited Arrowhead (*Sagittaria rigida*)
WET-02-2003-Q6	1602869	734904	Wild Rice (*Zizania aquatica*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Common Arrowhead (*Sagittaria latifolia*)
			Reed Canary Grass (*Phalaris arundinacea*)
			Rice Cut Grass (*Leersia oryzoides*)
			Walter Millet (*Echinochola walteri*)
			Sessile Fruited Arrowhead (*Sagittaria rigida*)

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Point ID	Northing	Easting	Species Observed
WET-02-2003-Q7	1602926	734867	Wild Rice (*Zizania aquatica*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Common Arrowhead (*Sagittaria latifolia*)
			Rice Cut Grass (*Leersia oryzoides*)
			Pickerel Weed (*Pontederia cordata*)
			Walter Millet (*Echinochola walteri*)
			Sessile Fruited Arrowhead (*Sagittaria rigida*)
WET-02-2003-Q8	1602933	734863	Wild Rice (*Zizania aquatica*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Common Arrowhead (*Sagittaria latifolia*)
			Rice Cut Grass (*Leersia oryzoides*)
			Walter Millet (*Echinochola walteri*)
			Sessile Fruited Arrowhead (*Sagittaria rigida*)
WET-02-2003-Q9	1602943	734855	Wild Rice (*Zizania aquatica*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Common Arrowhead (*Sagittaria latifolia*)
			Rice Cut Grass (*Leersia oryzoides*)
			Pickerel Weed (*Pontederia cordata*)
			Walter Millet (*Echinochola walteri*)
			Sessile Fruited Arrowhead (*Sagittaria rigida*)
WET-02-2003-UP	1602746	734993	Wild Rice (*Zizania aquatica*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Common Arrowhead (*Sagittaria latifolia*)
			Rice Cut Grass (*Leersia oryzoides*)
			Walter Millet (*Echinochola walteri*)
			Sessile Fruited Arrowhead (*Sagittaria rigida*)
WET-03-2003-DN	1575224	736996	Rice Cut Grass (*Leersia oryzoides*)
			Walter Millet (*Echinochola walteri*)
			Switchgrass (*Panicum virgatum*)
			Spike Rush (*Eleocharis rostellata*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Small Water Plantain (*Alisma plantago-aquatica*)
			Pickerel Weed (*Pontederia cordata*)
WET-03-2003-IN1	1575479	737060	Rice Cut Grass (*Leersia oryzoides*)
			Walter Millet (*Echinochola walteri*)
			Switchgrass (*Panicum virgatum*)
			Spike Rush (*Eleocharis rostellata*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Small Water Plantain (*Alisma plantago-aquatica*)
			Pickerel Weed (*Pontederia cordata*)
WET-03-2003-IN2	1575417	737043	Rice Cut Grass (*Leersia oryzoides*)
			Walter Millet (*Echinochola walteri*)
			Switchgrass (*Panicum virgatum*)
			Spike Rush (*Eleocharis rostellata*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Small Water Plantain (*Alisma plantago-aquatica*)
			Pickerel Weed (*Pontederia cordata*)

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Point ID	Northing	Easting	Species Observed
WET-03-2003-OFF1	1575468	737095	Rice Cut Grass (*Leersia oryzoides*)
			Walter Millet (*Echinochola walteri*)
			Switchgrass (*Panicum virgatum*)
			Spike Rush (*Eleocharis rostellata*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Small Water Plantain (*Alisma plantago-aquatica*)
			Pickerel Weed (*Pontederia cordata*)
WET-03-2003-OFF2	1575411	737064	Rice Cut Grass (*Leersia oryzoides*)
			Walter Millet (*Echinochola walteri*)
			Switchgrass (*Panicum virgatum*)
			Spike Rush (*Eleocharis rostellata*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Small Water Plantain (*Alisma plantago-aquatica*)
			Pickerel Weed (*Pontederia cordata*)
WET-03-2003-Q1	1575500	737078	Rice Cut Grass (*Leersia oryzoides*)
			Walter Millet (*Echinochola walteri*)
			Switchgrass (*Panicum virgatum*)
			Spike Rush (*Eleocharis rostellata*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Small Water Plantain (*Alisma plantago-aquatica*)
			Pickerel Weed (*Pontederia cordata*)
WET-03-2003-Q2	1575475	737086	Rice Cut Grass (*Leersia oryzoides*)
			Walter Millet (*Echinochola walteri*)
			Switchgrass (*Panicum virgatum*)
			Spike Rush (*Eleocharis rostellata*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Small Water Plantain (*Alisma plantago-aquatica*)
			Pickerel Weed (*Pontederia cordata*)
WET-03-2003-Q3	1575465	737067	Rice Cut Grass (*Leersia oryzoides*)
			Walter Millet (*Echinochola walteri*)
			Switchgrass (*Panicum virgatum*)
			Spike Rush (*Eleocharis rostellata*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Small Water Plantain (*Alisma plantago-aquatica*)
			Pickerel Weed (*Pontederia cordata*)
WET-03-2003-UP	1575536	737089	Rice Cut Grass (*Leersia oryzoides*)
			Walter Millet (*Echinochola walteri*)
			Switchgrass (*Panicum virgatum*)
			Spike Rush (*Eleocharis rostellata*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Small Water Plantain (*Alisma plantago-aquatica*)
			Pickerel Weed (*Pontederia cordata*)

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Point ID	Northing	Easting	Species Observed
WET-04-2003-DN	1567012	735711	Cattail (*Typha latifolia*)
			Common Arrowhead (*Sagittaria latifolia*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Pickerel Weed (*Pontederia cordata*)
			Soft Stemmed Bull Rush (*Scirpus validus*)
			Rice Cut Grass (*Leersia oryzoides*)
			BugleWeed (*Ajuga reptans*)
			Common Clot Bur (*Xanthium chinense*)
WET-04-2003-IN1	1567246	735621	Cattail (*Typha latifolia*)
			Common Arrowhead (*Sagittaria latifolia*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Pickerel Weed (*Pontederia cordata*)
			Soft Stemmed Bull Rush (*Scirpus validus*)
			Rice Cut Grass (*Leersia oryzoides*)
			BugleWeed (*Ajuga reptans*)
			Common Clot Bur (*Xanthium chinense*)
WET-04-2003-IN2	1567159	735694	Cattail (*Typha latifolia*)
			Common Arrowhead (*Sagittaria latifolia*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Pickerel Weed (*Pontederia cordata*)
			Soft Stemmed Bull Rush (*Scirpus validus*)
			Rice Cut Grass (*Leersia oryzoides*)
			BugleWeed (*Ajuga reptans*)
			Common Clot Bur (*Xanthium chinense*)
WET-04-2003-OFF1	1567225	735590	Cattail (*Typha latifolia*)
			Common Arrowhead (*Sagittaria latifolia*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Pickerel Weed (*Pontederia cordata*)
			Soft Stemmed Bull Rush (*Scirpus validus*)
			Rice Cut Grass (*Leersia oryzoides*)
			BugleWeed (*Ajuga reptans*)
			Common Clot Bur (*Xanthium chinense*)
WET-04-2003-OFF2	1567132	735674	Cattail (*Typha latifolia*)
			Common Arrowhead (*Sagittaria latifolia*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Pickerel Weed (*Pontederia cordata*)
			Soft Stemmed Bull Rush (*Scirpus validus*)
			Rice Cut Grass (*Leersia oryzoides*)
			BugleWeed (*Ajuga reptans*)
			Common Clot Bur (*Xanthium chinense*)
WET-04-2003-Q1	1567032	735705	Cattail (*Typha latifolia*)
			Common Arrowhead (*Sagittaria latifolia*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Pickerel Weed (*Pontederia cordata*)
			Soft Stemmed Bull Rush (*Scirpus validus*)
			Rice Cut Grass (*Leersia oryzoides*)
			BugleWeed (*Ajuga reptans*)
			Common Clot Bur (*Xanthium chinense*)

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Point ID	Northing	Easting	Species Observed
WET-04-2003-Q2	1567036	735703	Cattail (*Typha latifolia*)
			Common Arrowhead (*Sagittaria latifolia*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Wild Rice (*Zizania aquatica*)
			Pickerel Weed (*Pontederia cordata*)
			Soft Stemmed Bull Rush (*Scirpus validus*)
			Rice Cut Grass (*Leersia oryzoides*)
			BugleWeed (*Ajuga reptans*)
			Common Clot Bur (*Xanthium chinense*)
WET-04-2003-Q3	1567042	735703	Cattail (*Typha latifolia*)
			Common Arrowhead (*Sagittaria latifolia*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Pickerel Weed (*Pontederia cordata*)
			Soft Stemmed Bull Rush (*Scirpus validus*)
			Rice Cut Grass (*Leersia oryzoides*)
			BugleWeed (*Ajuga reptans*)
			Common Clot Bur (*Xanthium chinense*)
WET-04-2003-Q4	1567153	735679	Cattail (*Typha latifolia*)
			Common Arrowhead (*Sagittaria latifolia*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Pickerel Weed (*Pontederia cordata*)
			Soft Stemmed Bull Rush (*Scirpus validus*)
			Rice Cut Grass (*Leersia oryzoides*)
			BugleWeed (*Ajuga reptans*)
			Common Clot Bur (*Xanthium chinense*)
WET-04-2003-Q5	1567165	735677	Cattail (*Typha latifolia*)
			Common Arrowhead (*Sagittaria latifolia*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Pickerel Weed (*Pontederia cordata*)
			Soft Stemmed Bull Rush (*Scirpus validus*)
			Rice Cut Grass (*Leersia oryzoides*)
			BugleWeed (*Ajuga reptans*)
			Common Clot Bur (*Xanthium chinense*)
WET-04-2003-Q6	1567172	735670	Cattail (*Typha latifolia*)
			Common Arrowhead (*Sagittaria latifolia*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Pickerel Weed (*Pontederia cordata*)
			Soft Stemmed Bull Rush (*Scirpus validus*)
			Rice Cut Grass (*Leersia oryzoides*)
			BugleWeed (*Ajuga reptans*)
			Common Clot Bur (*Xanthium chinense*)
WET-04-2003-Q7	1567172	735660	Cattail (*Typha latifolia*)
			Common Arrowhead (*Sagittaria latifolia*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Pickerel Weed (*Pontederia cordata*)
			Soft Stemmed Bull Rush (*Scirpus validus*)
			Rice Cut Grass (*Leersia oryzoides*)
			BugleWeed (*Ajuga reptans*)
			Common Clot Bur (*Xanthium chinense*)

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Point ID	Northing	Easting	Species Observed
WET-04-2003-Q8	1567153	735665	Cattail (*Typha latifolia*)
			Common Arrowhead (*Sagittaria latifolia*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Pickerel Weed (*Pontederia cordata*)
			Soft Stemmed Bull Rush (*Scirpus validus*)
			Rice Cut Grass (*Leersia oryzoides*)
			BugleWeed (*Ajuga reptans*)
			Common Clot Bur (*Xanthium chinense*)
WET-04-2003-Q9	1567147	735673	Cattail (*Typha latifolia*)
			Common Arrowhead (*Sagittaria latifolia*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Pickerel Weed (*Pontederia cordata*)
			Soft Stemmed Bull Rush (*Scirpus validus*)
			Rice Cut Grass (*Leersia oryzoides*)
			BugleWeed (*Ajuga reptans*)
			Common Clot Bur (*Xanthium chinense*)
WET-04-2003-UP	1567265	735577	Cattail (*Typha latifolia*)
			Common Arrowhead (*Sagittaria latifolia*)
			Great Bur Reed (*Sparganium eurycarpum*)
			Pickerel Weed (*Pontederia cordata*)
			Soft Stemmed Bull Rush (*Scirpus validus*)
			Rice Cut Grass (*Leersia oryzoides*)
			BugleWeed (*Ajuga reptans*)
			Common Clot Bur (*Xanthium chinense*)
UCB-1-2003-01	1614710	735294	None
UCB-1-2003-02	1614673	735260	None
UCB-1-2003-03	1614662	735285	None
UCB-1-2003-04	1614550	735305	None
UCB-1-2003-05	1614563	735352	None
UCB-1-2003-06	1614484	735369	None
UCB-1-2003-07	1614463	735345	None
UCB-1-2003-08	1614541	735262	None
UCB-1-2003-09	1614513	735281	None
UCB-2-2003-01	1611303	734686	None
UCB-2-2003-02	1611243	734716	None
UCB-2-2003-03	1611225	734642	None
UCB-2-2003-04	1611192	734626	None
UCB-2-2003-05	1611167	734648	None
UCB-2-2003-06	1611156	734613	None
UCB-2-2003-07	1611117	734565	None
UCB-2-2003-08	1611061	734555	None
UCB-2-2003-09	1611073	734522	None
UCB-3-2003-01	1596821	737403	None
UCB-3-2003-02	1597014	737252	None
UCB-3-2003-03	1597012	737330	None
UCB-3-2003-04	1596958	737337	None
UCB-3-2003-05	1596924	737316	None
UCB-3-2003-06	1596922	737361	None
UCB-3-2003-07	1596868	737395	None

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Point ID	Northing	Easting	Species Observed
UCB-3-2003-08	1596830	737300	None
UCB-3-2003-09	1596810	737369	None
UCB-4-2003-01	1594202	736996	None
UCB-4-2003-02	1594212	736988	None
UCB-4-2003-03	1594195	736953	None
UCB-4-2003-04	1594155	736965	None
UCB-4-2003-05	1594102	736915	None
UCB-4-2003-06	1594063	736894	None
UCB-4-2003-07	1594029	736891	None
UCB-4-2003-08	1594010	736905	None
UCB-4-2003-09	1593970	736872	None
UCB-5-2003-01	1567938	735123	None
UCB-5-2003-02	1567907	735103	None
UCB-5-2003-03	1567896	735138	None
UCB-5-2003-04	1567883	735155	None
UCB-5-2003-05	1567717	735203	None
UCB-5-2003-06	1567697	735139	None
UCB-5-2003-07	1567782	735134	None
UCB-5-2003-08	1567805	735195	None
UCB-5-2003-09	1567821	735174	None
UCB-6-2003-01	1614689	736081	None
UCB-6-2003-02	1614641	736084	None
UCB-6-2003-03	1614610	736073	None
UCB-6-2003-04	1614570	736088	None
UCB-6-2003-05	1614600	736116	None
UCB-6-2003-06	1614566	736135	None
UCB-6-2003-07	1614543	736129	None
UCB-6-2003-08	1614466	736109	None
UCB-6-2003-09	1614472	736105	None
SHO-01R-2003-01A	1616145	733665	Silver Maple (*Acer Saccharinum*)
			Elm spp. (*Ulmus spp.*)
			Fern sp.
			Dogwood spp. (*Cornus spp.*)
SHO-01R-2003-01B	1616134	733659	Silver Maple (*Acer Saccharinum*)
			Elm spp. (*Ulmus spp.*)
			Fern sp.
			Dogwood spp. (*Cornus spp.*)
SHO-01R-2003-02A	1615942	733848	Silver Maple (*Acer Saccharinum*)
			Elm spp. (*Ulmus spp.*)
			Fern sp.
			Dogwood spp. (*Cornus spp.*)
SHO-01R-2003-02B	1615928	733828	Silver Maple (*Acer Saccharinum*)
			Elm spp. (*Ulmus spp.*)
			Fern sp.
			Dogwood spp. (*Cornus spp.*)
SHO-01R-2003-03B	1615801	733989	Silver Maple (*Acer Saccharinum*)
			Elm spp. (*Ulmus spp.*)
			Fern sp.
			Dogwood spp. (*Cornus spp.*)

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Point ID	Northing	Easting	Species Observed
SHO-01R-2003-03A	1615809	734007	Silver Maple (*Acer Saccharinum*)
			Elm spp. (*Ulmus spp.*)
			Fern sp.
			Dogwood spp. (*Cornus spp.*)
SHO-02R-2003-01A	1598665	737296	Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Jewel Weed spp. (*Impatiens spp.*)
			Speckled Alder (*Alnus rugosa*)
			Staghorn Sumac (*Rhus typhina*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			Dogwood spp. (*Cornus spp.*)
			White Pine (*Pinus strobus*)
			Black Willow (*Salix nigra*)
			Black Cherry (*Prunis serotina*)
SHO-02R-2003-01B	1598684	737310	Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Jewel Weed spp. (*Impatiens spp.*)
			Speckled Alder (*Alnus rugosa*)
			Staghorn Sumac (*Rhus typhina*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			Dogwood spp. (*Cornus spp.*)
			White Pine (*Pinus strobus*)
			Black Willow (*Salix nigra*)
			Black Cherry (*Prunis serotina*)
SHO-02R-2003-02A	1598608	737325	Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Staghorn Sumac (*Rhus typhina*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			Common Mullen (*Verbascum thapsus*)
			Black Cherry (*Prunis serotina*)
SHO-02R-2003-02B	1598603	737338	Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Staghorn Sumac (*Rhus typhina*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			Common Mullen (*Verbascum thapsus*)
			Black Cherry (*Prunis serotina*)

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Point ID	Northing	Easting	Species Observed
SHO-02R-2003-03A	1598470	737331	Tatarian Honeysuckle (*Lonicera tatarica*)
			Jewel Weed spp. (*Impatiens spp.*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			Fern sp.
			Dogwood spp. (*Cornus spp.*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			Black Cherry (*Prunis serotina*)
			Horsetail sp. (*Equisetum spp.*)
SHO-02R-2003-03B	1598458	737349	Tatarian Honeysuckle (*Lonicera tatarica*)
			Jewel Weed spp. (*Impatiens spp.*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			Fern sp.
			Dogwood spp. (*Cornus spp.*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			Black Cherry (*Prunis serotina*)
			Horsetail sp. (*Equisetum spp.*)
SHO-03R-2003-01A	1568430	734446	Speckled Alder (*Alnus rugosa*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			Golden Rod spp. (*Solidago spp.*)
			New York Fern (*Thelypteris noveboracensis*)
			American Basswood (*Tilia americana*)
			Dogwood spp. (*Cornus spp.*)
			White Pine (*Pinus strobus*)
			Queen Anne's Lace (Daucus carota)
			Sugar Maple (*Acer Saccharum*)
			Black Cherry (*Prunis serotina*)
			Horsetail sp. (*Equisetum spp.*)
			Hemlock (*Tsuga canadensis*)
SHO-03R-2003-01B	1568433	734427	Speckled Alder (*Alnus rugosa*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			Golden Rod spp. (*Solidago spp.*)
			New York Fern (*Thelypteris noveboracensis*)
			American Basswood (*Tilia americana*)
			Dogwood spp. (*Cornus spp.*)
			White Pine (*Pinus strobus*)
			Queen Anne's Lace (Daucus carota)
			Sugar Maple (*Acer Saccharum*)
			Black Cherry (*Prunis serotina*)
			Horsetail sp. (*Equisetum spp*.)
			Hemlock (Tsuga canadensis)

Appendix F - Geographic Coordinates and Species for Assessment Stations

Point ID	Northing	Easting	Species Observed
SHO-03R-2003-02A	1568105	734448	Red Oak (*Quercus rubra*)
			Speckled Alder (*Alnus rugosa*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			American Basswood (*Tilia americana*)
			Dogwood spp. (*Cornus spp.*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			White Pine (*Pinus strobus*)
			Brown Gound Nut (*Apios americana*)
			Black Cherry (*Prunis serotina*)
			Hemlock (*Tsuga canadensis*)
SHO-03R-2003-02B	1568099	734426	Red Oak (*Quercus rubra*)
			Speckled Alder (*Alnus rugosa*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			American Basswood (*Tilia americana*)
			Dogwood spp. (*Cornus spp.*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			White Pine (*Pinus strobus*)
			Brown Gound Nut (*Apios americana*)
			Black Cherry (*Prunis serotina*)
			Hemlock (*Tsuga canadensis*)
SHO-03R-2003-03A	1567703	734495	Wild Grape spp. (*Vitus spp.*)
			Staghorn Sumac (*Rhus typhina*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			White Pine (*Pinus strobus*)
			Aster spp. (*Aster spp.*)
			Fern spp.
			Hemlock (*Tsuga canadensis*)
			Witch Hazel (*Hammamelis virginiana*)
SHO-03R-2003-03B	1567692	734475	Wild Grape spp. (*Vitus spp.*)
			Staghorn Sumac (*Rhus typhina*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			White Pine (*Pinus strobus*)
			Aster spp. (*Aster spp.*)
			Fern spp.
			Hemlock (*Tsuga canadensis*)
			Witch Hazel (*Hammamelis virginiana*)

Appendix F - Geographic Coordinates and Species for Assessment Stations

Point ID	Northing	Easting	Species Observed
SHO-01I-2003-01A	1615051	734642	Wild Grape spp. (*Vitus spp.*)
			Silver Maple (*Acer Saccharinum*)
			Elm spp. (*Ulmus spp.*)
			Purple Loosestrife (*Lythrum salicaria*)
			Sensitive Fern (*Onoclea sensibilis*)
			Bittersweet spp. (*Celastrus spp.*)
			Eastern Cottonwood (*Populus deltoides*)
			Black Cherry (*Prunis serotina*)
SHO-01I-2003-01B	1615037	734627	Wild Grape spp. (*Vitus spp.*)
			Silver Maple (*Acer Saccharinum*)
			Elm spp. (*Ulmus spp.*)
			Purple Loosestrife (*Lythrum salicaria*)
			Sensitive Fern (*Onoclea sensibilis*)
			Bittersweet spp. (*Celastrus spp.*)
			Eastern Cottonwood (*Populus deltoides*)
			Black Cherry (*Prunis serotina*)
SHO-01I-2003-02A	1614863	734712	Silver Maple (*Acer Saccharinum*)
			Elm spp. (*Ulmus spp.*)
			Golden Rod spp. (*Solidago spp.*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			Queen Anne's Lace (Daucus carota)
			Bittersweet spp. (*Celastrus spp.*)
			Fern sp.
SHO-01I-2003-02B	1614866	734685	Silver Maple (*Acer Saccharinum*)
			Elm spp. (*Ulmus spp.*)
			Golden Rod spp. (*Solidago spp.*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			Queen Anne's Lace (Daucus carota)
			Bittersweet spp. (*Celastrus spp.*)
			Fern sp.
SHO-01I-2003-03A	1614559	734847	Wild Grape spp. (*Vitus spp.*)
			Staghorn Sumac (*Rhus typhina*)
			Elm spp. (*Ulmus spp.*)
			Golden Rod spp. (*Solidago spp.*)
			Purple Loosestrife (*Lythrum salicaria*)
			Sensitive Fern (*Onoclea sensibilis*)
			Bittersweet spp. (*Celastrus spp.*)
			Stiff Arrowhead (*Sagittaria rigida*)
SHO-01I-2003-03B	1614547	734838	Wild Grape spp. (*Vitus spp.*)
			Staghorn Sumac (*Rhus typhina*)
			Elm spp. (*Ulmus spp.*)
			Golden Rod spp. (*Solidago spp.*)
			Purple Loosestrife (*Lythrum salicaria*)
			Sensitive Fern (*Onoclea sensibilis*)
			Bittersweet spp. (*Celastrus spp.*)
			Stiff Arrowhead (*Sagittaria rigida*)

Appendix F - Geographic Coordinates and Species for Assessment Stations

Point ID	Northing	Easting	Species Observed
SHO-02I-2003-01A	1614143	735466	Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Jewel Weed spp. (*Impatiens spp.*)
			Silver Maple (*Acer Saccharinum*)
			Elm spp. (*Ulmus spp.*)
			Sensitive Fern (*Onoclea sensibilis*)
			Black Cherry (*Prunis serotina*)
SHO-02I-2003-01B	1614146	735485	Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Jewel Weed spp. (*Impatiens spp.*)
			Silver Maple (*Acer Saccharinum*)
			Elm spp. (*Ulmus spp.*)
			Sensitive Fern (*Onoclea sensibilis*)
			Black Cherry (*Prunis serotina*)
SHO-02I-2003-02A	1613930	735477	Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Silver Maple (*Acer Saccharinum*)
			Elm spp. (*Ulmus spp.*)
			Bittersweet spp. (*Celastrus spp.*)
SHO-02I-2003-02B	1613939	735486	Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Silver Maple (*Acer Saccharinum*)
			Elm spp. (*Ulmus spp.*)
			Bittersweet spp. (*Celastrus spp.*)
SHO-02I-2003-03A	1613689	735535	Silver Maple (*Acer Saccharinum*)
			New York Fern (*Thelypteris noveboracensis*)
			Sensitive Fern (*Onoclea sensibilis*)
SHO-02I-2003-03B	1613707	735554	Silver Maple (*Acer Saccharinum*)
			New York Fern (*Thelypteris noveboracensis*)
			Sensitive Fern (*Onoclea sensibilis*)
SHO-03I-2003-01A	1614167	736349	Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Staghorn Sumac (*Rhus typhina*)
			White Ash (*Fraxinus americana*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			Eastern Cottonwood (*Populus deltoides*)
			Black Cherry (*Prunis serotina*)
			Box Elder (*Acer negundo*)
SHO-03I-2003-01B	1614168	736370	Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Staghorn Sumac (*Rhus typhina*)
			White Ash (*Fraxinus americana*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			Eastern Cottonwood (*Populus deltoides*)
			Black Cherry (*Prunis serotina*)
			Box Elder (*Acer negundo*)

Appendix F - Geographic Coordinates and Species for Assessment Stations

Point ID	Northing	Easting	Species Observed
SHO-03I-2003-02A	1613851	736392	Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			American Basswood (*Tilia americana*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			Black Cherry (*Prunis serotina*)
SHO-03I-2003-02B	1613852	736412	Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			American Basswood (*Tilia americana*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			Black Cherry (*Prunis serotina*)
SHO-03I-2003-03A	1613612	736403	Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Jewel Weed spp. (*Impatiens spp.*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			American Basswood (*Tilia americana*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			Common Buckthorn (*Rhamnus cathartica*)
			Box Elder (*Acer negundo)*
			Barberry spp. (*Berberis spp.*)
SHO-03I-2003-03B	1613616	736418	Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Jewel Weed spp. (*Impatiens spp.*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			American Basswood (*Tilia americana*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			Common Buckthorn (*Rhamnus cathartica*)
			Box Elder (*Acer negundo)*
			Barberry spp. (*Berberis spp.*)
SHO-04I-2003-01A	1613391	736154	Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Golden Rod spp. (*Solidago spp.*)
			New York Fern (*Thelypteris noveboracensis*)
			Northern Catalpa (*Catalpa speciosa*)
			Dogwood spp. (*Cornus spp.*)
			Sensitive Fern (*Onoclea sensibilis*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			Eastern Cottonwood (*Populus deltoides*)
			ButtonBush (*Cephalanthus occidentalis*)

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Appendix F - Geographic Coordinates and Species for Assessment Stations

Point ID	Northing	Easting	Species Observed
SHO-04I-2003-01B	1613405	736135	Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Golden Rod spp. (*Solidago spp.*)
			New York Fern (*Thelypteris noveboracensis*)
			Northern Catalpa (*Catalpa speciosa*)
			Dogwood spp. (*Cornus spp.*)
			Sensitive Fern (*Onoclea sensibilis*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			Eastern Cottonwood (*Populus deltoides*)
			ButtonBush (*Cephalanthus occidentalis*)
SHO-04I-2003-02A	1613148	736041	Black Willow (*Salix nigra*)
			Wild Grape spp. (*Vitus spp.*)
			Staghorn Sumac (*Rhus typhina*)
			Silver Maple (*Acer Saccharinum*)
			Elm spp. (*Ulmus spp.*)
			Golden Rod spp. (*Solidago spp.*)
			Sensitive Fern (*Onoclea sensibilis*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			White Snakeroot (*Eupatorium rugosum*)
			Eastern Cottonwood (*Populus deltoides*)
			Common Elderberry (*Sambucus canadensis*)
SHO-04I-2003-02B	1613165	736026	Black Willow (*Salix nigra*)
			Wild Grape spp. (*Vitus spp.*)
			Staghorn Sumac (*Rhus typhina*)
			Silver Maple (*Acer Saccharinum*)
			Elm spp. (*Ulmus spp.*)
			Golden Rod spp. (*Solidago spp.*)
			Sensitive Fern (*Onoclea sensibilis*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			White Snakeroot (*Eupatorium rugosum*)
			Eastern Cottonwood (*Populus deltoides*)
			Common Elderberry (*Sambucus canadensis*)
SHO-04I-2003-03A	1612980	735907	Yellow Sneezeweed (*Helenium autumnale*)
			Red Oak (*Quercus rubra*)
			Speckled Alder (*Alnus rugosa*)
			Staghorn Sumac (*Rhus typhina*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Golden Rod spp. (*Solidago spp.*)
			Joe Pye Weed spp. (*Eupatorium spp.*)
			Dogwood spp. (*Cornus spp.*)
			Sensitive Fern (*Onoclea sensibilis*)
			ButtonBush (*Cephalanthus occidentalis*)

Appendix F - Geographic Coordinates and Species for Assessment Stations

Point ID	Northing	Easting	Species Observed
SHO-04I-2003-03B	1612985	735890	Yellow Sneezeweed (*Helenium autumnale*)
			Red Oak (*Quercus rubra*)
			Speckled Alder (*Alnus rugosa*)
			Staghorn Sumac (*Rhus typhina*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Golden Rod spp. (*Solidago spp.*)
			Joe Pye Weed spp. (*Eupatorium spp.*)
			Dogwood spp. (*Cornus spp.*)
			Sensitive Fern (*Onoclea sensibilis*)
			ButtonBush (*Cephalanthus occidentalis*)
SHO-05I-2003-01A	1597876	736729	Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Black Locust (*Robinia pseudoacacia*)
			Northern Catalpa (*Catalpa speciosa*)
			Dogwood spp. (*Cornus spp.*)
			Sensitive Fern (*Onoclea sensibilis*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			Eastern Cottonwood (*Populus deltoides*)
			ButtonBush (*Cephalanthus occidentalis*)
			Bittersweet spp. (*Celastrus spp.*)
			Brown Gound Nut (*Apios americana*)
			Black Cherry (*Prunis serotina*)
SHO-05I-2003-01B	1597864	736714	Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Black Locust (*Robinia pseudoacacia*)
			Northern Catalpa (*Catalpa speciosa*)
			Dogwood spp. (*Cornus spp.*)
			Sensitive Fern (*Onoclea sensibilis*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			Eastern Cottonwood (*Populus deltoides*)
			ButtonBush (*Cephalanthus occidentalis*)
			Bittersweet spp. (*Celastrus spp.*)
			Brown Gound Nut (*Apios americana*)
			Black Cherry (*Prunis serotina*)
SHO-05I-2003-02A	1597680	736746	Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Dogwood spp. (*Cornus spp.*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			Eastern Cottonwood (*Populus deltoides*)

Appendix F - Geographic Coordinates and Species for Assessment Stations

Point ID	Northing	Easting	Species Observed
SHO-05I-2003-02B	1597686	736730	Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Dogwood spp. (*Cornus spp.*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			Eastern Cottonwood (*Populus deltoides*)
SHO-05I-2003-03A	1597518	736753	Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Speckled Alder (*Alnus rugosa*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			Dogwood spp. (*Cornus spp.*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			White Snakeroot (*Eupatorium rugosum*)
			Eastern Cottonwood (*Populus deltoides*)
			Aster spp. (*Aster spp.*)
			Sugar Maple (*Acer Saccharum*)
SHO-05I-2003-03B	1597523	736734	Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Speckled Alder (*Alnus rugosa*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			Dogwood spp. (*Cornus spp.*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			White Snakeroot (*Eupatorium rugosum*)
			Eastern Cottonwood (*Populus deltoides*)
			Aster spp. (*Aster spp.*)
			Sugar Maple (*Acer Saccharum*)
SHO-06I-2003-01A	1597304	737338	Wild Grape spp. (*Vitus spp.*)
			Staghorn Sumac (*Rhus typhina*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			Black Locust (*Robinia pseudoacacia*)
SHO-06I-2003-01B	1597301	737355	Wild Grape spp. (*Vitus spp.*)
			Staghorn Sumac (*Rhus typhina*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			Black Locust (*Robinia pseudoacacia*)

Appendix F - Geographic Coordinates and Species for Assessment Stations

Point ID	Northing	Easting	Species Observed
SHO-06I-2003-02A	1597007	737434	Yellow Sneezeweed (*Helenium autumnale*)
			Black Willow (*Salix nigra*)
			Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Jewel Weed spp. (*Impatiens spp.*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			Golden Rod spp. (*Solidago spp.*)
			Black Locust (*Robinia pseudoacacia*)
			Purple Loosestrife (*Lythrum salicaria*)
			Dogwood spp. (*Cornus spp.*)
			Turtle Head (*Chelone glabra*)
SHO-06I-2003-02B	1597011	737457	Yellow Sneezeweed (*Helenium autumnale*)
			Black Willow (*Salix nigra*)
			Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Jewel Weed spp. (*Impatiens spp.*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			Golden Rod spp. (*Solidago spp.*)
			Black Locust (*Robinia pseudoacacia*)
			Purple Loosestrife (*Lythrum salicaria*)
			Dogwood spp. (*Cornus spp.*)
			Turtle Head (*Chelone glabra*)
SHO-06I-2003-03A	1596776	737513	Yellow Sneezeweed (*Helenium autumnale*)
			Tatarian Honeysuckle (*Lonicera tatarica*)
			Speckled Alder (*Alnus rugosa*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			Golden Rod spp. (*Solidago spp.*)
			Dogwood spp. (*Cornus spp.*)
			Sensitive Fern (*Onoclea sensibilis*)
			Turtle Head (*Chelone glabra*)
SHO-06I-2003-03B	1596788	737531	Yellow Sneezeweed (*Helenium autumnale*)
			Tatarian Honeysuckle (*Lonicera tatarica*)
			Speckled Alder (*Alnus rugosa*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			Golden Rod spp. (*Solidago spp.*)
			Dogwood spp. (*Cornus spp.*)
			Sensitive Fern (*Onoclea sensibilis*)
			Turtle Head (*Chelone glabra*)

Appendix F - Geographic Coordinates and Species for Assessment Stations

Point ID	Northing	Easting	Species Observed
SHO-07I-2003-01A	1595002	736141	Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			New York Fern (*Thelypteris noveboracensis*)
			Dogwood spp. (*Cornus spp.*)
			Sensitive Fern (*Onoclea sensibilis*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			Horsetail sp. (*Equisetum spp*.)
SHO-07I-2003-01B	1594996	736156	Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			New York Fern (*Thelypteris noveboracensis*)
			Dogwood spp. (*Cornus spp.*)
			Sensitive Fern (*Onoclea sensibilis*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			Horsetail sp. (*Equisetum spp*.)
SHO-07I-2003-02A	1594876	736126	Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Jewel Weed spp. (*Impatiens spp.*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			Dogwood spp. (*Cornus spp.*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
SHO-07I-2003-02B	1594874	736141	Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Jewel Weed spp. (*Impatiens spp.*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			Dogwood spp. (*Cornus spp.*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
SHO-07I-2003-03A	1594746	736110	Black Willow (*Salix nigra*)
			Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Jewel Weed spp. (*Impatiens spp.*)
			Speckled Alder (*Alnus rugosa*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			New York Fern (*Thelypteris noveboracensis*)
			Common Elderberry (*Sambucus canadensis*)

Appendix F - Geographic Coordinates and Species for Assessment Stations

Point ID	Northing	Easting	Species Observed
SHO-07I-2003-03B	1594744	736140	Black Willow (*Salix nigra*)
			Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Jewel Weed spp. (*Impatiens spp.*)
			Speckled Alder (*Alnus rugosa*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			New York Fern (*Thelypteris noveboracensis*)
			Common Elderberry (*Sambucus canadensis*)
SHO-08I-2003-01A	1594975	737821	Black Willow (*Salix nigra*)
			Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Speckled Alder (*Alnus rugosa*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			Golden Rod spp. (*Solidago spp.*)
			Purple Loosestrife (*Lythrum salicaria*)
			Dogwood spp. (*Cornus spp.*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			Queen Anne's Lace (Daucus carota)
			Common Elderberry (*Sambucus canadensis*)
SHO-08I-2003-01B	1594963	737838	Black Willow (*Salix nigra*)
			Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Speckled Alder (*Alnus rugosa*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			Golden Rod spp. (*Solidago spp.*)
			Purple Loosestrife (*Lythrum salicaria*)
			Dogwood spp. (*Cornus spp.*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			Queen Anne's Lace (Daucus carota)
			Common Elderberry (*Sambucus canadensis*)
SHO-08I-2003-02A	1594792	737669	Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Jewel Weed spp. (*Impatiens spp.*)
			Staghorn Sumac (*Rhus typhina*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			Golden Rod spp. (*Solidago spp.*)
			American Basswood (*Tilia americana*)
			Virginia Creeper (*Parthenocissus quinqefolia*)

Appendix F - Geographic Coordinates and Species for Assessment Stations

Point ID	Northing	Easting	Species Observed
SHO-08I-2003-03A	1594669	737618	Yellow Sneezeweed (*Helenium autumnale*)
			Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Speckled Alder (*Alnus rugosa*)
			Staghorn Sumac (*Rhus typhina*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			Purple Loosestrife (*Lythrum salicaria*)
			Dogwood spp. (*Cornus spp.*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			Turtle Head (*Chelone glabra*)
SHO-08I-2003-03B	1594676	737640	Yellow Sneezeweed (*Helenium autumnale*)
			Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Speckled Alder (*Alnus rugosa*)
			Staghorn Sumac (*Rhus typhina*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			Purple Loosestrife (*Lythrum salicaria*)
			Dogwood spp. (*Cornus spp.*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			Turtle Head (*Chelone glabra*)
SHO-09I-2003-01A	1567313	734603	Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Jewel Weed spp. (*Impatiens spp.*)
			Staghorn Sumac (*Rhus typhina*)
			Silver Maple (*Acer Saccharinum*)
			American Basswood (*Tilia americana*)
			Purple Loosestrife (*Lythrum salicaria*)
			Dogwood spp. (*Cornus spp.*)
			White Pine (*Pinus strobus*)
			Juniper sp.
SHO-09I-2003-01B	1567309	734584	Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Jewel Weed spp. (*Impatiens spp.*)
			Staghorn Sumac (*Rhus typhina*)
			Silver Maple (*Acer Saccharinum*)
			American Basswood (*Tilia americana*)
			Purple Loosestrife (*Lythrum salicaria*)
			Dogwood spp. (*Cornus spp.*)
			White Pine (*Pinus strobus*)
			Juniper sp.

Appendix F - Geographic Coordinates and Species for Assessment Stations

Point ID	Northing	Easting	Species Observed
SHO-09I-2003-02A	1567052	734674	Black Willow (*Salix nigra*)
			Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			American Basswood (*Tilia americana*)
			Purple Loosestrife (*Lythrum salicaria*)
			Dogwood spp. (*Cornus spp.*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			White Pine (*Pinus strobus*)
			Common Buckthorn (*Rhamnus cathartica*)
SHO-09I-2003-02B	1567043	734676	Black Willow (*Salix nigra*)
			Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			American Basswood (*Tilia americana*)
			Purple Loosestrife (*Lythrum salicaria*)
			Dogwood spp. (*Cornus spp.*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			White Pine (*Pinus strobus*)
			Common Buckthorn (*Rhamnus cathartica*)
SHO-09I-2003-03A	1566878	734741	Black Willow (*Salix nigra*)
			Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Staghorn Sumac (*Rhus typhina*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			Golden Rod spp. (*Solidago spp.*)
			Purple Loosestrife (*Lythrum salicaria*)
			Dogwood spp. (*Cornus spp.*)
			Sensitive Fern (*Onoclea sensibilis*)
SHO-09I-2003-03B	1566874	734719	Black Willow (*Salix nigra*)
			Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Staghorn Sumac (*Rhus typhina*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			Golden Rod spp. (*Solidago spp.*)
			Purple Loosestrife (*Lythrum salicaria*)
			Dogwood spp. (*Cornus spp.*)
			Sensitive Fern (*Onoclea sensibilis*)

Appendix F - Geographic Coordinates and Species for Assessment Stations

Point ID	Northing	Easting	Species Observed
SHO-10I-2003-01A	1594054	736832	Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			Dogwood spp. (*Cornus spp.*)
			Sensitive Fern (*Onoclea sensibilis*)
			White Snakeroot (*Eupatorium rugosum*)
			Black Cherry (*Prunis serotina*)
			Evening Primrose (*Oenothera biennis*)
SHO-10I-2003-01B	1594068	736814	Tatarian Honeysuckle (*Lonicera tatarica*)
			Wild Grape spp. (*Vitus spp.*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			Dogwood spp. (*Cornus spp.*)
			Sensitive Fern (*Onoclea sensibilis*)
			White Snakeroot (*Eupatorium rugosum*)
			Black Cherry (*Prunis serotina*)
			Evening Primrose (*Oenothera biennis*)
SHO-10I-2003-02A	1593788	736686	Tatarian Honeysuckle (*Lonicera tatarica*)
			Jewel Weed spp. (*Impatiens spp.*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			Dogwood spp. (*Cornus spp.*)
			Sensitive Fern (*Onoclea sensibilis*)
			Aster spp. (*Aster spp.*)
SHO-10I-2003-02B	1593801	736667	Tatarian Honeysuckle (*Lonicera tatarica*)
			Jewel Weed spp. (*Impatiens spp.*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			Dogwood spp. (*Cornus spp.*)
			Sensitive Fern (*Onoclea sensibilis*)
			Aster spp. (*Aster spp.*)
SHO-10I-2003-03A	1593572	736553	Black Willow (*Salix nigra*)
			Speckled Alder (*Alnus rugosa*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			Purple Loosestrife (*Lythrum salicaria*)
			Dogwood spp. (*Cornus spp.*)
			Sensitive Fern (*Onoclea sensibilis*)
			ButtonBush (*Cephalanthus occidentalis*)

Appendix F - Geographic Coordinates and Species for Assessment Stations

Point ID	Northing	Easting	Species Observed
SHO-10I-2003-03B	1593606	736521	Black Willow (*Salix nigra*)
			Speckled Alder (*Alnus rugosa*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Elm spp. (*Ulmus spp.*)
			Purple Loosestrife (*Lythrum salicaria*)
			Dogwood spp. (*Cornus spp.*)
			Sensitive Fern (*Onoclea sensibilis*)
			ButtonBush (*Cephalanthus occidentalis*)
SHO-11I-2003-01A	1565808	736307	Jewel Weed spp. (*Impatiens spp.*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Pickerel Weed (*Pontederia cordata*)
			Sensitive Fern (*Onoclea sensibilis*)
			Aster spp. (*Bidens spp.*)
SHO-11I-2003-01B	1565822	736327	Jewel Weed spp. (*Impatiens spp.*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Pickerel Weed (*Pontederia cordata*)
			Sensitive Fern (*Onoclea sensibilis*)
			Aster spp. (*Bidens spp.*)
SHO-11I-2003-02A	1565660	736385	Black Willow (*Salix nigra*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Northern Catalpa (*Catalpa speciosa*)
			Sensitive Fern (*Onoclea sensibilis*)
			Aster spp. (*Bidens spp.*)
SHO-11I-2003-02B	1565677	736386	Black Willow (*Salix nigra*)
			Silver Maple (*Acer Saccharinum*)
			White Ash (*Fraxinus americana*)
			Northern Catalpa (*Catalpa speciosa*)
			Sensitive Fern (*Onoclea sensibilis*)
			Aster spp. (*Bidens spp.*)
SHO-11I-2003-03A	1565406	736488	Wild Grape spp. (*Vitus spp.*)
			Jewel Weed spp. (*Impatiens spp.*)
			Speckled Alder (*Alnus rugosa*)
			Staghorn Sumac (*Rhus typhina*)
			Silver Maple (*Acer Saccharinum*)
			Golden Rod spp. (*Solidago spp.*)
			Black Locust (*Robinia pseudoacacia*)
			Purple Loosestrife (*Lythrum salicaria*)
			Dogwood spp. (*Cornus spp.*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			Queen Anne's Lace (Daucus carota)
			Eastern Cottonwood (*Populus deltoides*)
			Soft-stem Bullrush (*Scirpus validus*)
			Box Elder (*Acer negundo)*
			Common Clotbur (*Xanthium chinense*)
			Sedge spp. (*Carex spp.*)

Appendix F - Geographic Coordinates and Species for Assessment Stations

Point ID	Northing	Easting	Species Observed
SHO-11I-2003-03B	1565405	736507	Wild Grape spp. (*Vitus spp.*)
			Jewel Weed spp. (*Impatiens spp.*)
			Speckled Alder (*Alnus rugosa*)
			Staghorn Sumac (*Rhus typhina*)
			Silver Maple (*Acer Saccharinum*)
			Golden Rod spp. (*Solidago spp.*)
			Black Locust (*Robinia pseudoacacia*)
			Purple Loosestrife (*Lythrum salicaria*)
			Dogwood spp. (*Cornus spp.*)
			Virginia Creeper (*Parthenocissus quinqefolia*)
			Queen Anne's Lace (Daucus carota)
			Eastern Cottonwood (*Populus deltoides*)
			Soft-stem Bullrush (*Scirpus validus*)
			Box Elder (*Acer negundo)*
			Common Clotbur (*Xanthium chinense*)
			Sedge spp. (*Carex spp.*)

Appendix G

Tables for Habitat Assessment Data

BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

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Appendix G - Habitat Assessment Data (UCB-Assessment Data) (Unconsolidated Bottom)

				Inorganic Shoreline Substrate Components							Organic Substrate Components				Epifaunal Substrate/Available Cover (Low Gradient)				Pool Substrate Characterization (Low Gradient)			
Station Number	River Section	Northing	Easting	Bedrock	Boulder	Cobble	Gravel	Sand	Silt	Clay	Detritus	Muck-Mud	Marl	Mussels	Optimal	Suboptimal	Marginal	Poor	Optimal	Suboptimal	Marginal	Poor
UCB-1-2003-01	1	492164.581	224118.068				60	40			30		70			X			X			
UCB-1-2003-02	1	492153.365	224107.621				60	40			20		80			X			X			
UCB-1-2003-03	1	492149.998	224115.166			10	50	40			20		80			X			X			
UCB-1-2003-04	1	492115.814	224121.507				60	40			20		80			X			X			
UCB-1-2003-05	1	492119.818	224135.861			10	50	40			20		80		X				X			
UCB-1-2003-06	1	492095.571	224140.889			10	50	40			Trace		100			X			X			
UCB-1-2003-07	1	492089.327	224133.650				60	40					100			X			X			
UCB-1-2003-08	1	492112.953	224108.269				50	50			20		80			X			X			
UCB-1-2003-09	1	492104.542	224114.089				50	50			10		90			X			X			
UCB-2-2003-01	1	491126.081	223932.869					60	40		Trace	90	10	1			X			X		
UCB-2-2003-02	1	491107.876	223941.788					80	20		40	60		2			X			X		
UCB-2-2003-03	1	491102.365	223919.423					30	70			100		2			X				X	
UCB-2-2003-04	1	491092.193	223914.445					50	50		Trace	100		1			X				X	
UCB-2-2003-05	1	491084.550	223921.188					70	30		30	70		1			X				X	
UCB-2-2003-06	1	491081.230	223910.626					60	40		10	70					X				X	
UCB-2-2003-07	1	491069.376	223896.008					50	50		Trace	80		2			X				X	
UCB-2-2003-08	1	491052.432	223892.849					60	40		30	60		1			X				X	
UCB-2-2003-09	1	491055.888	223882.610					60	40		Trace	80		1			X				X	
UCB-3-2003-01	1	486712.023	224760.956		50	50					Trace			1	X				X			
UCB-3-2003-02	1	486770.807	224714.965		10	20	30	10	30		10	50		2		X				X		
UCB-3-2003-03	1	486770.285	224738.526		40	40	10	Trace	10		Trace	20		3	X				X			
UCB-3-2003-04	1	486753.700	224740.683		30	40	10	Trace	20		10	20		2	X				X			
UCB-3-2003-05	1	486743.501	224734.318				50	Trace	50	Trace	Trace	70	30	2			X				X	
UCB-3-2003-06	1	486742.860	224748.013		20	Trace	50	Trace	30		10	50		1			X				X	
UCB-3-2003-07	1	486726.482	224758.328			Trace	70	Trace	30		10	20	50	1			X				X	
UCB-3-2003-08	1	486714.655	224729.428		10	10	20	20	40		20	60	20	4		X				X		
UCB-3-2003-09	1	486708.617	224750.499			10	50	10	30		40	30	30	2			X				X	
UCB-4-2003-01	1	485913.881	224636.946		Trace	20	60		20			30	50	3			X				X	
UCB-4-2003-02	1	485916.900	224634.252					40	60		30	50		1			X				X	
UCB-4-2003-03	1	485911.517	224623.860					30	60	10	10	90		2		X				X		
UCB-4-2003-04	1	485899.359	224627.508					30	60	10	10	90		1			X				X	
UCB-4-2003-05	1	485883.124	224612.110					30	60	10	30	90		3			X				X	
UCB-4-2003-06	1	485871.522	224605.703				10	30	50	10	20	80	Trace	2			X				X	
UCB-4-2003-07	1	485861.028	224604.972					30	60	10	30	70		1			X				X	
UCB-4-2003-08	1	485855.183	224609.233					70	30			30	Trace				X				X	
UCB-4-2003-09	1	485842.974	224598.950					80	20		10	20					X				X	
UCB-5-2003-01	2	477908.435	224065.985		30	10	Trace		Trace		70	20		1	X				X			
UCB-5-2003-02	2	477899.120	224059.859				Trace	40	60		10			1			X				X	
UCB-5-2003-03	2	477895.640	224070.580					30	70		10	Trace		2			X				X	
UCB-5-2003-04	2	477891.781	224075.573					30	70		10	Trace		2			X				X	
UCB-5-2003-05	2	477841.171	224090.255					30	70		10	Trace		1			X				X	
UCB-5-2003-06	2	477835.139	224070.844					30	70		10	Trace		1			X				X	
UCB-5-2003-07	2	477860.972	224069.252					30	70		10	Trace		2			X			X		
UCB-5-2003-08	2	477867.999	224087.900		Trace			20	80		30	10		1		X				X		
UCB-5-2003-09	2	477872.723	224081.491		Trace			30	70		30	10		2		X				X		
UCB-6-2003-01	1	492158.173	224357.932				Trace	70	30		10	10	10				X				X	
UCB-6-2003-02	1	492143.607	224358.969				Trace	70	30		10	10	10				X				X	
UCB-6-2003-03	1	492133.985	224355.528				Trace	70	30		30	10	10				X				X	
UCB-6-2003-04	1	492122.032	224360.062				Trace	70	30		30	30	10				X				X	
UCB-6-2003-05	1	492131.112	224368.500				Trace	70	30		10	10	10				X				X	
UCB-6-2003-06	1	492120.721	224374.512				Trace	70	30		30	10	10				X				X	
UCB-6-2003-07	1	Missing data point	Missing data point				Trace	70	30		20	10	10				X				X	
UCB-6-2003-08	1	492090.109	224366.394				Trace	70	30			10	10					X				X
UCB-6-2003-09	1	492092.174	224365.288				Trace	70	30			10	10					X				X

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Appendix G - Habitat Assessment Data (UCB-WQ) (Unconsolidated Bottom - WQ)

				Light Availability Measurements		Current Velocity Measurements		Water Quality Measurements					
Station Number	River Section	Northing	Easting	Depth of Sensor (m)	Air / UW	Height Above Substrate (cm)	Current Velocity (ft/s)	Temp. (°C)	Conductivity	Dissolved Oxygen	pH	Turbidity	ORP (mv)
UCB-1-2003-01	1	492164.581	224118.068										
UCB-1-2003-02	1	492153.365	224107.621	0.5	1072 / 619	10	0.61	17.42	0.118	8.3	7.49	4.4	-60
UCB-1-2003-03	1	492149.998	224115.166	1.0	1089 / 329	100	0.91						
UCB-1-2003-04	1	492115.814	224121.507										
UCB-1-2003-05	1	492119.818	224135.861										
UCB-1-2003-06	1	492095.571	224140.889										
UCB-1-2003-07	1	492089.327	224133.650										
UCB-1-2003-08	1	492112.953	224108.269										
UCB-1-2003-09	1	492104.542	224114.089										
UCB-2-2003-01	1	491126.081	223932.869										
UCB-2-2003-02	1	491107.876	223941.788										
UCB-2-2003-03	1	491102.365	223919.423										
UCB-2-2003-04	1	491092.193	223914.445	0.5	1788 / 932	10	0.17	17.64	0.121	7.66	7.51	12.4	-73
UCB-2-2003-05	1	491084.550	223921.188	1.0	1808 / 475	100	0.55						
UCB-2-2003-06	1	491081.230	223910.626										
UCB-2-2003-07	1	491069.376	223896.008										
UCB-2-2003-08	1	491052.432	223892.849										
UCB-2-2003-09	1	491055.888	223882.610										
UCB-3-2003-01	1	486712.023	224760.956										
UCB-3-2003-02	1	486770.807	224714.965										
UCB-3-2003-03	1	486770.285	224738.526										
UCB-3-2003-04	1	486753.700	224740.683	0.5	1431 / 591	10	0.30	17.35	0.127	6.89	7.23	7.9	-70
UCB-3-2003-05	1	486743.501	224734.318	1.0	1285 / 400	100	0.81						
UCB-3-2003-06	1	486742.860	224748.013										
UCB-3-2003-07	1	486726.482	224758.328										
UCB-3-2003-08	1	486714.655	224729.428										
UCB-3-2003-09	1	486708.617	224750.499										
UCB-4-2003-01	1	485913.881	224636.946										
UCB-4-2003-02	1	485916.900	224634.252										
UCB-4-2003-03	1	485911.517	224623.860										
UCB-4-2003-04	1	485899.359	224627.508	0.5	1510 / 731	10	0.57	17.47	0.132	7.94	7.3	10.2	-71
UCB-4-2003-05	1	485883.124	224612.110	1.0	1503 / 394	100	0.37						
UCB-4-2003-06	1	485871.522	224605.703										
UCB-4-2003-07	1	485861.028	224604.972										
UCB-4-2003-08	1	485855.183	224609.233										
UCB-4-2003-09	1	485842.974	224598.950										
UCB-5-2003-01	2	477908.435	224065.985										
UCB-5-2003-02	2	477899.120	224059.859										
UCB-5-2003-03	2	477895.640	224070.580										
UCB-5-2003-04	2	477891.781	224075.573	0.5	NA / NA	10	-0.12	17.04	0.132	7.72	7.5	7.2	-69
UCB-5-2003-05	2	477841.171	224090.255	1.0	NA / NA	100	-0.15						
UCB-5-2003-06	2	477835.139	224070.844										
UCB-5-2003-07	2	477860.972	224069.252										
UCB-5-2003-08	2	477867.999	224087.900										
UCB-5-2003-09	2	477872.723	224081.491										

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Appendix G - Habitat Assessment Data (UCB-WQ) (Unconsolidated Bottom - WQ)

				Light Availability Measurements		Current Velocity Measurements		Water Quality Measurements					
Station Number	River Section	Northing	Easting	Depth of Sensor (m)	Air / UW	Height Above Substrate (cm)	Current Velocity (ft/s)	Temp. (°C)	Conductivity	Dissolved Oxygen	pH	Turbidity	ORP (mv)
UCB-6-2003-01	1	492158.173	224357.932										
UCB-6-2003-02	1	492143.607	224358.969										
UCB-6-2003-03	1	492133.985	224355.528										
UCB-6-2003-04	1	492122.032	224360.062	0.5	1407 / 711.4	10	0.87	17.51	0.127	8.41	7.51	5	-76
UCB-6-2003-05	1	492131.112	224368.500	1.0	1461 / 479.1	100	1.11						
UCB-6-2003-06	1	492120.721	224374.512										
UCB-6-2003-07	1	Missing data point	Missing data point										
UCB-6-2003-08	1	492090.109	224366.394										
UCB-6-2003-09	1	492092.174	224365.288										

Notes:
General Description
UCB-1 - West side of Rogers Island; east side of smaller island in the West River Channel
UCB-2 - ~300 yards south of Lock 7; west side of channel
UCB-3 - Just south of north end of Griffin Island ~100 yards south, east side of channel
UCB-4 - South end of Griffin Island ~300 yards north of south tip, west side of channel
UCB-5 -~300 yards north of Northumberland Bridge; east side of channel
UCB-6 - East side of Roger's Island above POTW outfall

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Appendix G - Habitat Assessment Data (UCB-SSAP Grain Size)

Unconsolidated Bottom Samples			2002 - 2003 SSAP Grain Size Analyses[3]													
Station Number	Northing[1]	Easting[1]	Core ID	Northing[2]	Easting[2]	Sampling Technique	% Clay	% Silt	% Fine Sand	% Medium Sand	% Coarse Sand	% Gravel	% Fines	% Sands	% Coarse	Distance to Station (ft)
UCB-1-2003-01	492164.581	224118.068	RS1-9594-GP003	1614690.20	735370.00	GRAB	6.6	26.9	63.1	3.4	0.0	0.0	96.6	66.5	0.0	78.50
UCB-1-2003-03	492149.998	224115.166	RS1-9594-GP003	1614690.20	735370.00	GRAB	6.6	26.9	63.1	3.4	0.0	0.0	96.6	66.5	0.0	89.99
UCB-2-2003-02	491107.876	223941.788	RS1-9493-GP017	1611222.00	734618.00	GRAB	5.2	9.5	7.7	3.6	4.9	69.1	22.4	16.2	74.0	99.93
UCB-2-2003-03	491102.365	223919.423	RS1-9493-GP017	1611222.00	734618.00	GRAB	5.2	9.5	7.7	3.6	4.9	69.1	22.4	16.2	74.0	24.49
UCB-2-2003-04	491092.193	223914.445	RS1-9493-GP017	1611222.00	734618.00	GRAB	5.2	9.5	7.7	3.6	4.9	69.1	22.4	16.2	74.0	31.39
UCB-2-2003-05	491084.550	223921.188	RS1-9493-GP017	1611222.00	734618.00	GRAB	5.2	9.5	7.7	3.6	4.9	69.1	22.4	16.2	74.0	63.08
UCB-2-2003-06	491081.230	223910.626	RS1-9493-GP017	1611222.00	734618.00	GRAB	5.2	9.5	7.7	3.6	4.9	69.1	22.4	16.2	74.0	66.49
UCB-4-2003-07	485861.028	224604.972	RS1-9089-GP008	1593961.90	736905.40	CORE	1.1	18.4	2.4	15.1	40.2	22.7	21.9	57.7	62.9	68.58
UCB-4-2003-08	485855.183	224609.233	RS1-9089-GP008	1593961.90	736905.40	CORE	1.1	18.4	2.4	15.1	40.2	22.7	21.9	57.7	62.9	47.98
UCB-4-2003-09	485842.974	224598.950	RS1-9089-GP008	1593961.90	736905.40	CORE	1.1	18.4	2.4	15.1	40.2	22.7	21.9	57.7	62.9	34.60

Notes:

All SSAP is based on the February 3, 2004 version of QEA Export.

1. Station coordinates are in NAD83 NY State Plane East (meters).

2. SSAP coordinates are in NAD83 NY State Plane East (feet).

3. SSAP Grain Size Analysis samples >100 ft. from Station are not listed.

Fines = % clay + % silt + % fine sand

Sands = % fine sand + % medium sand + % coarse sand

Coarse = % coarse sand + % gravel

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Appendix G - Habitat Assessment Data (UCB-SSAP Other)

Unconsolidated Bottom Samples			Nearest 2002 - 2003 SSAP Cores					Surface Data							Subsurface Data								
Station Number	Northing[1]	Easting[1]	Core ID	Northing[2]	Easting[2]	Distance to Station (ft)	Sampling Technique	Sample Start Depth (in.)	Sample End Depth (in.)	Texture Description[3]	General Description	Bulk Density (g/cm^3)	Moisture Content (%)	TOC (mg/kg)	Sample Start Depth (in.)	Sample End Depth (in.)	Texture Description[3]	General Description	Liquid Limit	Plastic Limit	Plasticity Index	Specific Gravity	USCS Group Name
UCB-1-2003-01	492164.581	224118.068	RS1-9594-WS612	1614699.35	735258.89	36.71	CORE	0	2	CL/SI/--/GR	GRAY	1.1	26	8400									
UCB-1-2003-02	492153.365	224107.621	RS1-9594-WS612	1614699.35	735258.89	26.20	CORE	0	2	CL/SI/--/GR	GRAY	1.1	26	8400									
UCB-1-2003-03	492149.998	224115.166	RS1-9594-WS613	1614631.37	735297.96	33.56	CORE	0	2	CL/--/--/--	GRAY	0.99	34	4200									
UCB-1-2003-04	492115.814	224121.507	RS1-9594-WS614	1614561.18	735259.12	47.53	CORE	0	2	MS/GR/OR/--	SOME WOOD	0.77	36	27000									
UCB-1-2003-05	492119.818	224135.861	RS1-9594-WS170	1614628.42	735380.70	71.18	CORE	0	2	CS/FS/--/SI	GREY-BROWN	1.4	17	1000									
UCB-1-2003-06	492095.571	224140.889	RS1-9594-WS173	1614492.75	735297.71	71.78	CORE	0	2	GR/CS/FS/SI	GREY	1.2	20	2100									
UCB-1-2003-07	492089.327	224133.650	RS1-9594-WS173	1614492.75	735297.71	55.96	CORE	0	2	GR/CS/FS/SI	GREY	1.2	20	2100									
UCB-1-2003-08	492112.953	224108.269	RS1-9594-WS614	1614561.18	735259.12	20.78	CORE	0	2	MS/GR/OR/--	SOME WOOD	0.77	36	27000									
UCB-1-2003-09	492104.542	224114.089	RS1-9594-WS173	1614492.75	735297.71	26.26	CORE	0	2	GR/CS/FS/SI	GREY	1.2	20	2100									
UCB-2-2003-01	491126.081	223932.869	RS1-9493-WS138	1611307.32	734740.80	54.57	CORE	0	2	FS/OR/--/--	BROWN; SOME WOOD	1.2	17	7800									
UCB-2-2003-02	491107.876	223941.788	RS1-9493-WS714	1611228.64	734704.64	18.19	CORE	0	2	MS/--/FS/OR	DARK GREY BROWN. OR= WOOD CHIPS, WOOD PULP. SLIGHT ODOR	1.3	24										
UCB-2-2003-03	491102.365	223919.423	RS1-9493-WS655	1611235.39	734622.27	22.57	CORE	0	2	SI/FS/MS/OR	DARK GRAY BROWN, ORGANICS/LEAVES & VEGETATION	0.59	42	26000									
UCB-2-2003-04	491092.193	223914.445	RS1-9493-WS141	1611167.03	734661.15	42.93	CORE	0	2	FS/CS/--/GR	OLIVE BROWN	1.4	22	3100									
UCB-2-2003-05	491084.550	223921.188	RS1-9493-WS141	1611167.03	734661.15	13.06	CORE	0	2	FS/CS/--/GR	OLIVE BROWN	1.4	22	3100									
UCB-2-2003-06	491081.230	223910.626	RS1-9493-WS657	1611166.31	734584.44	30.90	CORE	0	2	OR/--/--/SI	GRAY BROWN, ORGANICS/SILT	0.10	83	320000									
UCB-2-2003-07	491069.376	223896.008	RS1-9493-WS658	1611098.13	734541.47	30.41	CORE	0	2	SI/FS/--/--	BROWN	0.84	39	21000									
UCB-2-2003-08	491052.432	223892.849	RS1-9493-WS658	1611098.13	734541.47	39.38	CORE	0	2	SI/FS/--/--	BROWN	0.84	39	21000									
UCB-2-2003-09	491055.888	223882.610	RS1-9493-WS658	1611098.13	734541.47	32.45	CORE	0	2	SI/FS/--/--	BROWN	0.84	39	21000									
UCB-3-2003-01	486712.023	224760.956	RS1-9190-ET260	1596827.21	737419.44	17.34	CORE	0	2	SI/OR/--/--	BROWN. OR= WEEDS, ROOTS..	0.64	56	37000									
UCB-3-2003-02	486770.807	224714.965	RS1-9190-ET230	1597033.71	737140.58	113.51	CORE	0	2	FS/SI/CS/OR	GRAY-BROWN; SOME WOOD	1.2	27.8	12000									
UCB-3-2003-03	486770.285	224738.526	RS1-9190-ET232	1597036.85	737384.45	60.10	CORE	0	2	SI/--/FS/OR	OLIVEBROWN,ORG=VEG	0.52	58.9	43000									
UCB-3-2003-04	486753.700	224740.683	RS1-9190-ES248	1596893.70	737294.03	76.99	CORE	0	2	FS/SI/GR/CS	DARK BROWN	1.5	20.3	3000									
UCB-3-2003-05	486743.501	224734.318	RS1-9190-ES248	1596893.70	737294.03	37.58	CORE	0	2	FS/SI/GR/CS	DARK BROWN	1.5	20.3	3000									
UCB-3-2003-06	486742.860	224748.013	RS1-9190-ES248	1596893.70	737294.03	72.57	CORE	0	2	FS/SI/GR/CS	DARK BROWN	1.5	20.3	3000									
UCB-3-2003-07	486726.482	224758.328	RS1-9190-ET260	1596827.21	737419.44	48.15	CORE	0	2	SI/OR/--/--	BROWN. OR= WEEDS, ROOTS..	0.64	56	37000									
UCB-3-2003-08	486714.655	224729.428	RS1-9190-ET259	1596824.83	737336.68	37.20	CORE	0	2	FS/GR/OR/--	DARK GREY BROWN. OR= WOOD.	1.6	13	1300									
UCB-3-2003-09	486708.617	224750.499	RS1-9190-ET259	1596824.83	737336.68	35.56	CORE	0	2	FS/GR/OR/--	DARK GREY BROWN. OR= WOOD.	1.6	13	1300									
UCB-4-2003-01	485913.881	224636.946	RS1-9089-WT125	1594188.75	736935.87	62.04	CORE	0	2	FS/--/--/OR	BROWN; OR-TRACE ROOTS	1	34	5400	2	24	FS/--/OR/--	BROWN, OLIVE BROWN, & LIGHT BROWN; TIGHT MATERIAL; OR-LITTLE ROOTS	0	0		2.67	Sandy Silt
UCB-4-2003-02	485916.900	224634.252	RS1-9089-WT118	1594261.94	736976.60	50.77	CORE	0	2	FS/--/--/SI	BROWN; TRACE TWIGS	1.3	28.6	21000									
UCB-4-2003-03	485911.517	224623.860	RS1-9089-WT125	1594188.75	736935.87	18.56	CORE	0	2	FS/--/--/OR	BROWN; OR-TRACE ROOTS	1	34	5400	2	24	FS/--/OR/--	BROWN, OLIVE BROWN, & LIGHT BROWN; TIGHT MATERIAL; OR-LITTLE ROOTS	0	0		2.67	Sandy Silt
UCB-4-2003-04	485899.359	224627.508	RS1-9089-CT130	1594123.13	736978.61	34.32	CORE	0	2	FS/--/SI/OR	BROWN, OR= WOOD	1.1	35.2	11000									
UCB-4-2003-05	485883.124	224612.110	RS1-9089-WT711	1594094.15	736934.58	21.03	CORE	0	2	FS/--/--/--	BROWN	1.3	24	4000									
UCB-4-2003-06	485871.522	224605.703	RS1-9089-WT137	1594058.28	736858.34	35.92	CORE	0	2	SI/--/--/--	GRAY-BROWN	0.55	62.1	57000									
UCB-4-2003-07	485861.028	224604.972	RS1-9089-CT142	1593986.56	736899.50	43.25	CORE	0	2	FS/--/--/OR	LIGHT BROWN, OR-BARK	1	6.9	1200									
UCB-4-2003-08	485855.183	224609.233	RS1-9089-CT142	1593986.56	736899.50	24.07	CORE	0	2	FS/--/--/OR	LIGHT BROWN, OR-BARK	1	6.9	1200									
UCB-4-2003-09	485842.974	224598.950	RS1-9089-CT142	1593986.56	736899.50	32.43	CORE	0	2	FS/--/--/OR	LIGHT BROWN, OR-BARK	1	6.9	1200									
UCB-5-2003-01	477908.435	224065.985	RS2-8584-ET129	1567891.04	735137.05	48.90	CORE	0	2	SI/FS/--/--	GRAY-BROWN	0.99	38.6	13000									
UCB-5-2003-02	477899.120	224059.859	RS2-8584-ET129	1567891.04	735137.05	37.71	CORE	0	2	SI/FS/--/--	GRAY-BROWN	0.99	38.6	13000									
UCB-5-2003-03	477895.640	224070.580	RS2-8584-ET129	1567891.04	735137.05	5.04	CORE	0	2	SI/FS/--/--	GRAY-BROWN	0.99	38.6	13000									
UCB-5-2003-04	477891.781	224075.573	RS2-8584-ET129	1567891.04	735137.05	19.20	CORE	0	2	SI/FS/--/--	GRAY-BROWN	0.99	38.6	13000									
UCB-5-2003-05	477841.171	224090.255	RS2-8584-ET140	1567685.73	735176.83	40.82	CORE	0	2	SI/--/--/OR	GRAY BROWN, OR=VEG	0.52	57.1	42000	2	12	SI/--/FS/OR	GRAY BROWN, OR=VEG	43	0		2.27	Silty Sand
UCB-5-2003-06	477835.139	224070.844	RS2-8584-ET140	1567685.73	735176.83	39.51	CORE	0	2	SI/--/--/OR	GRAY BROWN, OR=VEG	0.52	57.1	42000	2	12	SI/--/FS/OR	GRAY BROWN, OR=VEG	43	0		2.27	Silty Sand
UCB-5-2003-07	477860.972	224069.252	RS2-8584-ET137	1567754.14	735138.47	28.44	CORE	0	2	SI/FS/GR/--	BROWN	0.59	49.5	18000									
UCB-5-2003-08	477867.999	224087.900	RS2-8584-ET138	1567760.60	735219.80	51.06	CORE	0	2	SI/FS/OR/--	GRAY-BROWN; SOME WOOD	0.76	48.8	21000									
UCB-5-2003-09	477872.723	224081.491	RS2-8584-ET131	1567821.40	735100.00	74.03	CORE	0	2	SI/--/--/OR	DARK OLIVEBROWN, ORG=VEG	0.49	59.1	29000									
UCB-6-2003-01	492158.173	224357.932	RS1-9594-WT165	1614701.17	736056.75	27.14	CORE	0	2	FS/CS/--/--	BROWN	1.1	21	6800									
UCB-6-2003-02	492143.607	224358.969	RS1-9493-WT002	1614631.16	736100.17	18.68	CORE	0	2	CS/FS/--/OR	OLIVE BROWN, TRACE SLAG, ORG=VEG	1.1	27	3900									
UCB-6-2003-03	492133.985	224355.528	RS1-9493-WT002	1614631.16	736100.17	34.62	CORE	0	2	CS/FS/--/OR	OLIVE BROWN, TRACE SLAG, ORG=VEG	1.1	27	3900									
UCB-6-2003-04	492122.032	224360.062	RS1-9493-WT004	1614563.09	736060.13	28.78	CORE	0	2	OR/--/--/--	BROWN WOOD CHIPS	0.20	82	190000	2	24	FS/--/CS/CL	DARK BROWN, TRACE SLAG, DARK BROWN CLAY LAYER 22-24in.	0	0		2.36	Silty Sand
UCB-6-2003-05	492131.112	224368.500	RS1-9493-WT002	1614631.16	736100.17	34.65	CORE	0	2	CS/FS/--/OR	OLIVE BROWN, TRACE SLAG, ORG=VEG	1.1	27	3900									
UCB-6-2003-06	492120.721	224374.512	RS1-9493-WT701	1614566.54	736142.29	6.93	CORE	0	2	MS/FS/--/--	DARK BROWN;TRACE SLAG	1.2	22	16000									

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Appendix G - Habitat Assessment Data (UCB-SSAP Other)

Unconsolidated Bottom Samples			Nearest 2002 - 2003 SSAP Cores					Surface Data							Subsurface Data								
Station Number	Northing[1]	Easting[1]	Core ID	Northing[2]	Easting[2]	Distance to Station (ft)	Sampling Technique	Sample Start Depth (in.)	Sample End Depth (in.)	Texture Description[3]	General Description	Bulk Density (g/cm^3)	Moisture Content (%)	TOC (mg/kg)	Sample Start Depth (in.)	Sample End Depth (in.)	Texture Description[3]	General Description	Liquid Limit	Plastic Limit	Plasticity Index	Specific Gravity	USCS Group Name
UCB-6-2003-08	492090.109	224366.394	RS1-9493-WT007	1614492.39	736099.96	28.16	CORE	0	2	SI/FS/GR/OR	GREY; O-WOOD	0.18	78	84000									
UCB-6-2003-09	492092.174	224365.288	RS1-9493-WT007	1614492.39	736099.96	20.64	CORE	0	2	SI/FS/GR/OR	GREY; O-WOOD	0.18	78	84000									

Notes:

All SSAP is based on the February 3, 2004 version of QEA Export.

1. Station coordinates are in NAD83 NY State Plane East (meters).

2. SSAP coordinates are in NAD83 NY State Plane East (feet).

3. CL = clay; SI = silt; FS = fine sand; MS = medium sand;
CS = coarse sand; GR = gravel; OR = organic

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Appendix G - Habitat Assessment Data (SAV)

Habitat Type	Station	Quadrat	Species	Species Biomass (g/quad)	No. Stems spp	Total Biomass (g/m^2)	Total Stem Density (stems/m2)	Percent Cover	Depth (cm)	K (mg/l)	PO4 (mg/l)	NH4 (mg/l)
SAV	1	1	Va	69.69	229	562	1880	60	157			
SAV	1	1	Ppf	0.56	6				157			
SAV	1	2	Pn	3.71	26	315.92	888	50	85			
SAV	1	2	Va	35.78	85				85			
SAV	1	3	Va	11.21	36	89.68	288	50	95			
SAV	1	4	Pn	12.52	73	174.72	888	50	95			
SAV	1	4	Va	9.32	38				83			
SAV	1	5	Va	13.46	65	207.36	1536	70	87			
SAV	1	5	Pn	4.14	59				87			
SAV	1	5	Ppf	8.32	68				87			
SAV	1	6	Pn	5.83	53	85.2	552	30	140			
SAV	1	6	Va	4.82	16				140			
SAV	1	7	Va	9.13	37	73.04	296	10	187			
SAV	1	8	Va	16.69	51	133.52	408	60	91			
SAV	1	9	Va	14.93	50	119.44	400	20	157			
SAV	2	1	Ec	0.12	1	104.96	280	60	110			
SAV	2	1	Va	13	34	104	272	60	110			
SAV	2	2	Va	4.28	18	34.24	144	20	204			
SAV	2	3	Va	13.51	38	108.08	304	30	140			
SAV	2	4	Va	8.92	38	71.36	304	30	75.5			
SAV	2	5	Va	4.67	30	37.36	240	20	74	28.8	23.5	7.25
SAV	2	6	Pn	1.7	16	64.64	400	20	74	32.1	35.9	8.83
SAV	2	6	Va	6.38	34				80			
SAV	2	7	Va	8.17	4	65.36	32	80	79			
SAV	2	8	Pn	1.38	13	148.8	512	80	79	34.7	27.8	8.12
SAV	2	8	Va	17.22	51				125			
SAV	2	9	Va	4.86	19	38.88	152	40	164			
SAV	3	1	Va	3.25	21	26	168	10	127			
SAV	3	2	Va	8.46	23	67.68	184	30	167			
SAV	3	3	Va	9.97	46	79.76	368	70	77			
SAV	3	4	Pn	1.18	10	64	344	70	77			
SAV	3	4	Va	6.82	33				127			
SAV	3	5	Ec	0.15	7	24.48	192	50	127			
SAV	3	5	Va	2.91	17				200			
SAV	3	6	Va	6.72	28	53.76	224	70	92			
SAV	3	7	Va	5.12	32	40.96	256	60	102			
SAV	3	8	Ec	0.52	9	67.84	360	60	102			
SAV	3	8	Va	7.96	36				191			
SAV	3	9	Ec	1.15	1	72.4	320	50	191			
SAV	3	9	Va	7.9	39				45			
SAV	4	1	Va	13.3	28	106.4	224	70	276	38.2	39.8	26.2
SAV	4	2	Va	10.26	17	82.08	136	50	117	32.5	34.7	12.9

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Appendix G - Habitat Assessment Data (SAV)

Habitat Type	Station	Quadrat	Species	Species Biomass (g/quad)	No. Stems spp	Total Biomass (g/m^2)	Total Stem Density (stems/m2)	Percent Cover	Depth (cm)	K (mg/l)	PO4 (mg/l)	NH4 (mg/l)
SAV	4	3	Va	11.3	20	90.4	160	50	212			
SAV	4	4	Va	8.37	28	66.96	224	50	223			
SAV	4	5	Va	6.11	19	48.88	152	20	117			
SAV	4	6	Va	10.34	26	82.72	208	50	237	18.7	14.6	7.96
SAV	4	7	Va	8.99	19	71.92	152	40	205			
SAV	4	8	Va	10.24	34	81.92	272	50	225			
SAV	4	9	Pn	0.73	12	143.36	544	50	225			
SAV	4	9	Va	17.19	56				144			
SAV	5	1	Ppf	2.74	11	39.52	152	80	144			
SAV	5	1	Va	2.2	8				73	18.2	9.13	5.1
SAV	5	2	Ppf	1.06	2	119.76	464	60	73			
SAV	5	2	Va	13.91	56				73			
SAV	5	3	Va	11.56	41	92.48	328	80	70			
SAV	5	4	Va	4.43	12	35.44	96	70	200	26.2	31.8	7.44
SAV	5	5	Va	18.22	52	145.76	416	90	95			
SAV	5	6	Va	13.23	45	105.84	360	60	209			
SAV	5	7	Va	4.21	27	33.68	216	80	235			
SAV	5	8	Va	3.94	20	31.52	160	50	190			
SAV	5	9	Va	6.8	15	54.4	120	40	80			
SAV	6	1	Va	23.96	39	191.68	312	100	107	48.3	133	4.39
SAV	6	2	Ec	0.13	1	181.2	256	100	107			
SAV	6	2	Va	22.52	31				164			
SAV	6	3	Va	6.84	28	54.72	224	60	110			
SAV	6	4	Ec	2.22	1	17.76	8	90	200	26.1	19.7	10.9
SAV	6	5	Va	6.1	21	48.8	168	80	193	25.7	19.5	9.43
SAV	6	6	Va	9.49	23	75.92	184	50	206			
SAV	6	7	Va	10.13	38	81.04	304	90	183			
SAV	6	8	Va	10.09	36	80.72	288	80	212			
SAV	6	9	Ec	0.43	7	56.24	288	60	227			
SAV	6	9	Va	6.6	29	52.8	232	60	227			
SAV	7	1	Pg	3.36	18	65.84	272	70	126	43.2	71.4	11.7
SAV	7	1	Va	4.87	16			70	126			
SAV	7	2	Ec	0.96	7	42.24	296	60	70	29.6	30.3	12
SAV	7	2	Va	4.32	30			60	70			
SAV	7	3	Va	13.93	30	111.44	240	90	194	23.5	27.5	5.92
SAV	7	4	Va	4.63	38	37.04	304	80	64			
SAV	7	5	Va	11.92	25	95.36	200	50	234			
SAV	7	6	Va	5.27	32	42.16	256	60	67			
SAV	7	7	Va	7.63	43	61.04	344	90	57			
SAV	7	8	Va	14.74	37	117.92	296	80	243			
SAV	7	9	Va	7.81	30	62.48	240	80	161			
SAV	8	1	Pn	7.6	27	60.8	216	80	52	27.4	28.2	9.05

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Appendix G - Habitat Assessment Data (SAV)

Habitat Type	Station	Quadrat	Species	Species Biomass (g/quad)	No. Stems spp	Total Biomass (g/m^2)	Total Stem Density (stems/m2)	Percent Cover	Depth (cm)	K (mg/l)	PO4 (mg/l)	NH4 (mg/l)
SAV	8	2	Pn	4.4	15	56.64	320	80	57			
SAV	8	2	Va	2.68	25				57			
SAV	8	3	Pn	2.57	21	20.56	168	50	36			
SAV	8	4	Ec	0.56	8	51.04	360	50	115			
SAV	8	4	Va	5.82	37				115			
SAV	8	5	Ec	0.34	7	66.96	416	60	117			
SAV	8	5	Va	8.03	45				117			
SAV	8	6	Va	8.89	37	71.12	296	60	171	37.7	26	12.8
SAV	8	7	Ec	3.7	26	67.52	408	60	171	28.6	43.3	7.85
SAV	8	7	Va	4.74	25				46			
SAV	8	8	Va	6.55	26	52.4	208	50	127			
SAV	8	9	Ec	0.21	1	118.88	224	90	61			
SAV	8	9	Va	14.65	27				61			
SAV	9	1	Va	7.04	37	56.32	296	90	45	59.2	29.4	33.1
SAV	9	2	Va	28.53	38	228.24	304	70	169	68.2	33.9	16.3
SAV	9	3	Va	8.94	57	71.52	456	40	174			
SAV	9	4	Va	24.2	57	193.6	456	70	87			
SAV	9	5	Va	10.72	46	85.76	368	30	137	15.8	12.2	2.38
SAV	9	6	Va	19.4	26	155.2	208	70	97			
SAV	9	7	Va	2.04	17	16.32	136	30	55	35.5	45.6	6.5
SAV	9	8	Va	2.27	17	18.16	136	40	150			
SAV	9	9	Va	6.97	21	55.76	168	30	150			

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Appendix G - Habitat Assessment Data (SAV-Length)

Station	Quadrat	Species	Length (cm)	Length (cm)	Length (cm)	Length (cm)	Length (cm)	Min	Max	Mean
1	1	Va	153.2	167	176.1	165.4	156.5	153.2	176.1	163.64
1	1	Ppf	131.2	57.3	50.2	30.8	47.3	30.8	131.2	63.36
1	2	Va	160.1	170.3	164.6	202	146.4	146.4	202	168.68
1	2	Pn	135.8	153.6	151	157.1	88.8	88.8	157.1	137.26
1	3	Va	108.1	137.6	155.4	168.3	154.2	108.1	168.3	144.72
1	4	Va	133.9	153.7	108.1	136	141.1	108.1	153.7	134.56
1	4	Pn	119.9	108.8	147.2	112.3	137.4	108.8	147.2	125.12
1	5	Va	96.1	78.8	94.9	106.1	91.1	78.8	106.1	93.4
1	5	Pn	106.2	109.5	104.4	85.6	103.9	85.6	109.5	101.92
1	5	Ppf	76.2	90.2	81	101	90	76.2	101	87.68
1	6	Va	120.4	96	91.1	91.1	94.8	91.1	120.4	98.68
1	6	Pn	149.1	151.3	129.2	135.9	121.5	121.5	151.3	137.4
1	7	Va	81.9	92	97.8	81.2	78	78	97.8	86.18
1	8	Va	94.1	138.4	133.5	120.6	136.1	94.1	138.4	124.54
1	9	Va	129.8	124	138.1	107.9	137.5	107.9	138.1	127.46
2	1	Va	129.8	107.9	116.3	75	98.1	75	129.8	105.42
2	1	Ec	65					65	65	65
2	2	Va	146.1	109.4	70.9	87.9	80.1	70.9	146.1	98.88
2	3	Va	132.2	123.6	152	162.8	134	123.6	162.8	140.92
2	4	Va	86.8	68.4	71.5	83	80.5	68.4	86.8	78.04
2	5	Va	54	59.2	67.9	64.4	53.8	53.8	67.9	59.86
2	6	Va	68.2	66.4	58.2	46	48.6	46	68.2	57.48
2	6	Pn	61.4	75.8	71	48.1	71	48.1	75.8	65.46
2	7	Va	59.8	82.4	51.3	57.2	59.1	51.3	82.4	61.96
2	8	Va	124.2	107.9	117.5	88.3	111.1	88.3	124.2	109.8
2	8	Pn	21.3	70.1	98.9	84.1	73.1	21.3	98.9	69.5
2	9	Va	83.1	63.3	43.3	56.2	59.5	43.3	83.1	61.08
3	1	Va	106.7	110.1	105.7	88.4	89.6	88.4	110.1	100.1
3	2	Va	100.3	84.4	133.1	153.7	123.3	84.4	153.7	118.96
3	3	Va	74.8	84	70.4	40.6	57	40.6	84	65.36
3	4	Va	70.1	101.9	73.5	81.2	81.7	70.1	101.9	81.68

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Appendix G - Habitat Assessment Data (SAV-Length)

Station	Quadrat	Species	Length (cm)	Length (cm)	Length (cm)	Length (cm)	Length (cm)	Min	Max	Mean
3	4	Pn	76.2	111.9	96.3	135.1	34.4	34.4	135.1	90.78
3	5	Va	110.8	99.4	80.5	50.9	51.3	50.9	110.8	78.58
3	5	Ec								
3	6	Va	74.1	71.9	67.7	58	73.6	58	74.1	69.06
3	7	Va	61.4	66.1	65.4	62.5	61.4	61.4	66.1	63.36
3	8	Va	108.4	59.5	67	62.1	95.9	59.5	108.4	78.58
3	8	Ec	66.2	27.5	22.2	23.5	19.5	19.5	66.2	31.78
3	9	Va	44.3	42.7	49.5	43.6	50.1	42.7	50.1	46.04
3	9	Ec								
4	1	Va	16.5	167.7	154	149.5	111.1	16.5	167.7	119.76
4	2	Va	107.2	83.1	55.3	55.4	68.2	55.3	107.2	73.84
4	3	Va	138.2	131.9	143.3	137.1	115.9	115.9	143.3	133.28
4	4	Va	139	93.2	107.8	107.4	98.3	93.2	139	109.14
4	5	Va	83.9	65.9	57.9	56.6	54.1	54.1	83.9	63.68
4	6	Va	83.5	115.3	97.4	84.2	77.4	77.4	115.3	91.56
4	7	Va	96	117.8	123.7	101	87.3	87.3	123.7	105.16
4	8	Va	109.9	92.9	89.5	80.2	52.4	52.4	109.9	84.98
4	9	Va	104.7	127.5	105.7	95.7	77.1	77.1	127.5	102.14
4	9	Pn	47.4	65	46.5	43.9	43.9	43.9	65	49.34
5	1	Va	64.5	44.8	73.7	63.8	47.1	44.8	73.7	58.78
5	1	Ppf	103.3	78.5	77	35.2	34.5	34.5	103.3	65.7
5	2	Va	79.1	76.1	62	65.2	63.4	62	79.1	69.16
5	2	Ppf	105.2	75.4				75.4	105.2	90.3
5	3	Va	76.2	79	73.1	53.4	67.3	53.4	79	69.8
5	4	Va	156.4	41	45.4	44	76.1	41	156.4	72.58
5	5	Va	103.8	108	102.5	91.2	97.8	91.2	108	100.66
5	6	Va	96.6	99	108.5	94.4	72.7	72.7	108.5	94.24
5	7	Va	90.4	59.6	73.9	32.3	59.1	32.3	90.4	63.06
5	8	Va	85.6	45.6	60.2	66.6	62	45.6	85.6	64
5	9	Va	62.5	71.2	58.9	49	54.4	49	71.2	59.2
6	1	Va	112.4	123.3	139.2	100.1	101	100.1	139.2	115.2

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Appendix G - Habitat Assessment Data (SAV-Length)

Station	Quadrat	Species	Length (cm)	Length (cm)	Length (cm)	Length (cm)	Length (cm)	Min	Max	Mean
6	2	Va	205.3	177.3	183.1	212.7	181.4	177.3	212.7	191.96
6	3	Va	74.2	92.5	89.2	84.7	41	41	92.5	76.32
6	4	Ec								
6	5	Va	118.3	115.9	130.7	78.7	53	53	130.7	99.32
6	6	Va	101.2	125.3	124.7	104.6	73.9	73.9	125.3	105.94
6	7	Va	86.9	91.5	82	53.4	122.1	53.4	122.1	87.18
6	8	Va	99.1	78.9	68	86.1	85.2	68	99.1	83.46
6	9	Va	92.1	88.4	75.6	66.9	57.9	57.9	92.1	76.18
6	9	Ec	30.4	44	28.9	15	12.9	12.9	44	26.24
7	1	Va	44.4	40.3	67.2	49.8	29.6	29.6	67.2	46.26
7	1	Pg	81.3	78.7	108.1	66.5	97	66.5	108.1	86.32
7	2	Va	69	57.9	58	55	46.8	46.8	69	57.34
7	2	Ec	38.2	38.2	42.8	24	26.5	24	42.8	33.94
7	3	Va	156.2	138.7	120.8	116.9	109.1	109.1	156.2	128.34
7	4	Va	43.2	40.2	41.5	33	31.9	31.9	43.2	37.96
7	5	Va	122.4	82.1	107.2	78.2	83	78.2	122.4	94.58
7	6	Va	48.5	71.9	55.9	57.8	49.2	48.5	71.9	56.66
7	7	Va	51.8	40.2	54.2	46.6	34.1	34.1	54.2	45.38
7	8	Va	129.5	135.5	141.4	107.8	106.8	106.8	141.4	124.2
7	9	Va	84.5	95.9	87.3	84	85.2	84	95.9	87.38
8	1	Pn	69.1	80.3	62	65.5	63.4	62	80.3	68.06
8	2	Va	21	27	38.9	27.8	45.3	21	45.3	32
8	2	Pn	74.6	83.3	68.7	66.3	96.2	66.3	96.2	77.82
8	3	Pn	44.4	42.4	43.9	56.7	42.9	42.4	56.7	46.06
8	4	Va	58.8	40.6	37.2	34.7	51.4	34.7	58.8	44.54
8	4	Ec	40.7	22.5	18.9	26	26	18.9	40.7	26.82
8	5	Va	92.1	63.2	80.2	78.8	70.7	63.2	92.1	77
8	5	Ec	32.5	20.3	23.8	23.1	23.2	20.3	32.5	24.58
8	6	Va	86.2	109.3	98.4	59.4	71.3	59.4	109.3	84.92
8	7	Va	49.5	36.2	48.9	45.5	37	36.2	49.5	43.42
8	7	Ec	21.7	48.8	35.8	31.5	23.3	21.7	48.8	32.22

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Appendix G - Habitat Assessment Data (SAV-Length)

Station	Quadrat	Species	Length (cm)	Length (cm)	Length (cm)	Length (cm)	Length (cm)	Min	Max	Mean
8	8	Va	75.5	65.8	58.8	55.7	66.1	55.7	75.5	64.38
8	9	Va	78	73.8	82.9	55.3	47.4	47.4	82.9	67.48
8	9	Ec	49.2					49.2	49.2	49.2
9	1	Va	48.9	40.8	45.7	37.4	33.5	33.5	48.9	41.26
9	2	Va	123.9	137.3	128.1	111.1	122.1	111.1	137.3	124.5
9	3	Va	83.8	97.7	120.8	75.1	88.5	75.1	120.8	93.18
9	4	Va	100.7	104.9	87.4	76.3	92.3	76.3	104.9	92.32
9	5	Va	64.4	69.7	54.5	54.9	53.9	53.9	69.7	59.48
9	6	Va	114.9	127.1	124.8	102.3	116.3	102.3	127.1	117.08
9	7	Va	31.8	41	28.4	41.4	30.5	28.4	41.4	34.62
9	8	Va	60.6	57.7	48.3	47.1	68.9	47.1	68.9	56.52
9	9	Va	81.3	72	87.4	56.8	80.5	56.8	87.4	75.6

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Appendix G - Habitat Assessment Data (SAV WQ)

	Light Availability Measurements				Current Velocity Measurements			Water Quality Measurements												
								Parameter												
						Center of Bed	Outside Edge of Bed	Center of Bed							Outside Edge of Bed						
Station	Depth of Sensor (m)	Water Depth (cm)	Center of Bed (Air / UW)	Outside Edge of Bed (Air / UW)	Height Above Substrate (cm)	Current Velocity (ft/s)	Current Velocity (ft/s)	Temp. (°C)	Conductivity	Dissolved Oxygen	pH	Turbidity	ORP (mv)	Depth Below Surface (cm)	Temp. (°C)	Conductivity	Dissolved Oxygen	pH	Turbidity	ORP (mv)	Depth Below Surface (cm)
1	0.5	157	640 (top of canopy) / 393	N/A / N/A *	10	0.21	N/A	21.1	0.104	6.82	7.15	BLD	21	30	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1	1	N/A	637 / 30 (in veg)	N/A / N/A *	100	1.12	N/A														
2	0.5	131	405 / 266	397 / 169	10	0.08	0.38	21.6	0.104	6.99	8.28	BDL	33	25	21.5	0.104	7.11	6.62	BDL	34	25
2	1	202	410 / 133	394 / 90	100	0.32	0.86														
3	0.5	143	1467 / 722 **	1492 / 715 **	10	-0.07	-0.3	20.32	0.129	6.99	7.25	70.8	-3	40	20.44	0.121	7.39	7.21	-2.7	-3	40
3	1	400+	1483 / 493 **	1510 / 494 **	100	0.02	0.66														
4	0.5	183	1327 / 635	1432 / 579	10	0.04	-0.03	20.47	0.13	7.39	7.3	-3	-52	30	20.48	0.131	7.43	7.25	-3.1	-6	30
4	1	264	1338 / 252 (in veg)	1571 / 403	100	0.01	0.3														
5	0.5	186	1170 / 710	949 / 409	10	-0.06	-0.12	19.5	0.14	7.09	7.3	-3.2	-10	25	19.3	0.137	6.77	7.27	-5.6	-13	25
5	1	375	1225 / 364	1105 / 218	100	0.5	0.14														
6	0.5	187	740 / 324	224 / 95	10	-0.07	0.02	19.64	0.136	7.53	6.23	-1.9	-6	25	19.47	0.135	7.46	6.4	-3.8	-1	50
6	1	215	708 / 209	209 / 56	100	0.02	0.31														
7	0.5	420	131 / 42	1290 / 714	10	0	0.06	19.54	0.137	6.83	7.18	-1.8	-31	40	19.27	0.131	7.069	7.32	-4.5	-39	25
7	1	192	124 / 124	1287 / 465	100	-0.02	0.1														
8	0.5	N/A / N/A ***	N/A / N/A ***	N/A / N/A ***	10	-0.02	0.21	18.26	0.178	7.3	7.53	20.8	-67	35	18.17	0.172	7.4	7.41	20.3	-68	25
8	1	N/A / N/A ***	N/A / N/A ***	N/A / N/A ***	100	0	0.43														
9	0.5	N/A / N/A ***	N/A / N/A ***	N/A / N/A ***	10	0.18	0.21	18.15	0.174	7.14	7.48	23.3	-81	25	18.17	0.172	7.4	7.41	20.3	-68	25
9	1	N/A / N/A ***	N/A / N/A ***	N/A / N/A ***	100	-0.04	0.43														

Notes:
* No outside edge of bed, vegetation all the way across the channel.
** 3 inches of rain fell on 9/23/03 causing highwater and turbid conditions.
*** Due to overcast, light rain and turbid conditions, light measurements were not taken.

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Appendix G - Habitat Assessment Data (SAV-SSAP Other)

SAV Samples			Nearest 2002 - 2003 SSAP Cores					Surface Data							Subsurface Data								
Station Number	Latitude	Longitude	Core ID	Northing[1]	Easting[1]	Distance to Station (ft)	Sampling Technique	Sample Start Depth (in.)	Sample End Depth (in.)	Texture Description[2]	General Description	Bulk Density (g/cm^3)	Moisture Content (%)	TOC (mg/kg)	Sample Start Depth (in.)	Sample End Depth (in.)	Texture Description[2]	General Description	Liquid Limit	Plastic Limit	Plasticity Index	Specific Gravity	USCS Group Name
SAV-1-2003-Q1	43.26643	-73.59257	RS1-9594-WS057	1616434.06	733859.91	89.75	CORE	0	2	CS/GR/--/OR	MED BROWN, OR=VEGETATION	1.2	16	16000									
SAV-1-2003-Q2	43.26679	-73.59149	RS1-9594-WS051	1616572.54	734102.13	78.96	CORE	0	2	FS/GR/SI/OR	DARK GRAY; FEW WEEDS	1.2	25	6000									
SAV-1-2003-Q3	43.26609	-73.59331	RS1-9594-WS061	1616293.47	733619.37	57.59	CORE	0	2	GR/SI/CS/FS	DARK GREY BROWN	1.3	20	4800									
SAV-1-2003-Q4	43.26598	-73.59312	RS1-9594-WS061	1616293.47	733619.37	107.72	CORE	0	2	GR/SI/CS/FS	DARK GREY BROWN	1.3	20	4800									
SAV-1-2003-Q5	43.26619	-73.59302	RS1-9594-WS061	1616293.47	733619.37	71.53	CORE	0	2	GR/SI/CS/FS	DARK GREY BROWN	1.3	20	4800									
SAV-1-2003-Q6	43.26606	-73.59166	RS1-9594-WS069	1616158.47	734020.03	76.89	CORE	0	2	SI/FS/CS/OR	DARK GREY-BROWN; O-VEGETATION	1.1	30	6500									
SAV-1-2003-Q7	43.26476	-73.59066	RS1-9594-WS083	1615737.25	734258.78	66.85	CORE	0	2	CS/FS/GR/OR	DARK BROWN	1.4	21	7200									
SAV-1-2003-Q8	43.26527	-73.59228	RS1-9594-WS072	1616014.08	733787.75	125.34	CORE	0	2	SI/--/FS/OR	DARK BROWN;O-VEGETATION	0.83	42	9800									
SAV-1-2003-Q9	43.26521	-73.59135	RS1-9594-WS074	1616013.62	734102.28	101.64	CORE	0	2	FS/GR/SI/OR	DARK GREY	1.2	20										
SAV-2-2003-Q1	43.26087	-73.58751	RS1-9594-WS616	1614355.46	735137.89	39.94	CORE	0	2	FS/SI/MS/--	COARSE SAND	0.96	38	26000									
SAV-2-2003-Q2	43.26056	-73.58736	RS1-9594-WS177	1614214.51	735143.19	79.82	CORE	0	2	GR/CS/FS/SI	DARK GREY	1.3	21	4800									
SAV-2-2003-Q3	43.26025	-73.58727	RS1-9493-WS029	1614079.83	735217.27	51.64	CORE	0	2	SI/GR/CS/FS	DARK GREY	1.3	16	2100									
SAV-2-2003-Q4	43.26169	-73.58883	RS1-9594-WS167	1614634.09	734898.86	77.88	CORE	0	2	GR/--/--/SI	BROWN ;VOID WITHIN CORE SAMPLE	0.93	21	8200									
SAV-2-2003-Q5	43.26015	-73.58798	RS1-9493-WS603	1614075.87	735138.56	83.13	CORE	0	2	GR/FS/OR/--	AND TRACE OF WOOD	0.86	14	11000									
SAV-2-2003-Q6	43.26138	-73.58780	RS1-9594-WS708	1614562.65	735070.91	38.75	CORE	0	2	OR/FS/--/--	DARK BROWN OR WOOD	0.35	67										
SAV-2-2003-Q7	43.25940	-73.58789	RS1-9493-WS047	1613805.55	735066.55	17.23	CORE	0	2	SI/FS/--/OR	BROWN;O-WOOD	0.80	37	24000									
SAV-2-2003-Q8	43.26137	-73.58786	RS1-9594-WS708	1614562.65	735070.91	32.41	CORE	0	2	OR/FS/--/--	DARK BROWN OR WOOD	0.35	67										
SAV-2-2003-Q9	43.25947	-73.58758	RS1-9493-WS048	1613800.76	735223.75	70.92	CORE	0	2	SI/FS/--/CS	DARK GREY	1.1	37	8400									
SAV-3-2003-Q1	43.26335	-73.58430	RS1-9594-WT116	1615261.08	735980.03	41.85	CORE	0	2	CS/GR/--/--	BROWN	1.1	23	5600									
SAV-3-2003-Q2	43.26298	-73.58471	RS1-9594-WT123	1615182.24	735939.09	60.25	CORE	0	2	CS/FS/--/--	BROWN	1.3	24	990									
SAV-3-2003-Q3	43.26329	-73.58420	RS1-9594-WT124	1615186.11	736027.73	57.37	CORE	0	3	FS/CS/GR/--	DARK BROWN	1.3	26	11000									
SAV-3-2003-Q4	43.25759	-73.58413	RS1-9493-WS613	1613179.21	736061.03	34.55	CORE	0	2	MS/FS/--/OR	BROWN; O-ROOTS	1.1	31	7400									
SAV-3-2003-Q5	43.25740	-73.58440	RS1-9493-WS616	1613107.97	736018.77	12.89	CORE	0	2	FS/SI/OR/--	DARK BROWN. OR= ROOTS	0.88	45	76000									
SAV-3-2003-Q6	43.25699	-73.58493	RS1-9493-WS097	1612827.73	735938.04	128.48	CORE	0	2	CS/GR/FS/SI	BROWN GREY	1.4	12	6100									
SAV-3-2003-Q7	43.26281	-73.58404	RS1-9594-WT137	1615047.44	736098.20	20.38	CORE	0	2	SI/--/--/--	DARK BROWN	0.50	61	35000									
SAV-3-2003-Q8	43.26281	-73.58408	RS1-9594-WT137	1615047.44	736098.20	25.33	CORE	0	2	SI/--/--/--	DARK BROWN	0.50	61	35000									
SAV-3-2003-Q9	43.26246	-73.58380	RS1-9594-WT152	1614908.76	736176.17	35.29	CORE	0	2	SI/FS/--/--	DARK BROWN	1.2	30	3200									
SAV-4-2003-Q1	43.25108	-73.59117	RS1-9493-WT163	1610747.59	734259.78	29.49	CORE	0	2	FS/--/SI/--	DARK GRAY	0.93	30	13000									
SAV-4-2003-Q2	43.25118	-73.59126	RS1-9493-WT162	1610755.22	734179.37	63.99	CORE	0	2	FS/SI/OR/--	OLIVE BROWN, OR=VEG	0.91	36	14000									
SAV-4-2003-Q3	43.25122	-73.59108	RS1-9493-WT159	1610819.18	734298.42	32.66	CORE	0	2	SI/--/--/FS	DARK BROWN, TRACE WOOD CHIP	0.79	36	10000	2	24	FS/SI/--/CS	WOOD, AND CLAY	0	0		2.56	Silty Sand
SAV-4-2003-Q4	43.25073	-73.59169	RS1-9493-WT172	1610616.12	734180.97	80.50	CORE	0	2	OR/--/CS/--	WOOD CHIPS AND BARK MULCH	0.50	66	37000	6	12	OR/--/--/--	WOOD CHIPS AND BARK MULCH	0	0		2.1	Silty Sand
SAV-4-2003-Q5	43.25075	-73.59172	RS1-9493-WT172	1610616.12	734180.97	91.31	CORE	0	2	OR/--/CS/--	WOOD CHIPS AND BARK MULCH	0.50	66	37000	6	12	OR/--/--/--	WOOD CHIPS AND BARK MULCH	0	0		2.1	Silty Sand
SAV-4-2003-Q6	43.24658	-73.59253	RS1-9392-ET031	1609371.90	733778.30	271.06	CORE	0	2	SI/FS/--/--	GRAY-BROWN	0.92	34	9900									
SAV-4-2003-Q7	43.24955	-73.59253	RS1-9493-WT200	1610197.98	733859.78	27.53	CORE	0	2	SI/GR/FS/OR	DARK BROWN	1.2	28	17000									
SAV-4-2003-Q8	43.24981	-73.59253	RS1-9493-WT196	1610267.64	733897.30	37.57	CORE	0	2	FS/GR/--/--	DARK BROWN	0.96	27	10000									
SAV-4-2003-Q9	43.24998	-73.59248	RS1-9493-WT184	1610406.32	733902.40	40.29	CORE	0	2	SI/--/FS/--	DARK BROWN	1	36	10000									
SAV-5-2003-Q1	43.22083	-73.58225	RS1-9190-ET057	1599804.58	736739.13	33.26	CORE	0	2	CS/GR/SI/--	GRAY BROWN	1.4	23	4700									
SAV-5-2003-Q2	43.22076	-73.58220	RS1-9190-ET064	1599735.94	736780.16	28.89	CORE	0	2	MS/FS/CS/OR	DARK BROWN. TRACE GRAVEL. OR= ROOTS, VEGETATION	1.4	25	3500									
SAV-5-2003-Q3	43.22053	-73.58196	RS1-9190-ET072	1599667.04	736820.67	3.76	CORE	0	2	MS/CS/OR/--	BROWN, OR-VEG, CLAMS	1.1	26	3500	2	24	CS/GR/MS/OR	DARK GRAY/BROWN, OR-WOOD, VEG, ODOR, TRACE CLAY	0	0		2.66	Silty Sand with Gravel
SAV-5-2003-Q4	43.22080	-73.58246	RS1-9190-ET063	1599736.41	736700.54	32.02	GRAB	0	0	FS/MS/CS/OR	BROWN; OR-SOME WOOD, WEEDS, & BIOTA (CLAMS); TRACE GR	1.1	24	4600									
SAV-5-2003-Q5	43.22082	-73.58234	RS1-9190-ET063	1599736.41	736700.54	33.80	GRAB	0	0	FS/MS/CS/OR	BROWN; OR-SOME WOOD, WEEDS, & BIOTA (CLAMS); TRACE GR	1.1	24	4600									
SAV-5-2003-Q6	43.22019	-73.58183	RS1-9190-ET087	1599528.71	736821.09	34.26	CORE	0	2	MS/FS/CS/--	DARK BROWN	1.5	22	4900									
SAV-5-2003-Q7	43.22001	-73.58165	RS1-9190-ET088	1599527.40	736900.26	53.57	GRAB	0	0	GR/OR/--/FS	BROWN; OR-BIOTA (8 CLAMS, 1 SNAIL), SOME WEEDS	1.1	17	10000									
SAV-5-2003-Q8	43.21996	-73.58140	RS1-9190-ES099	1599390.50	736980.51	69.72	CORE	0	2	SI/FS/--/MS	DARK BROWN.	0.71	49	16000									
SAV-5-2003-Q9	43.22031	-73.58151	RS1-9190-ET080	1599597.36	736940.74	13.04	CORE	0	2	FS/--/SI/OR	GREY BROWN. OR= WOOD.	0.80	41	16000									
SAV-6-2003-Q1	43.21110	-73.57844	RS1-9190-ET342	1596204.20	737783.05	36.42	CORE	0	2	SI/FS/--/--	GRAY-BROWN; SLIGHT PCB-ODOR	0.46	64.7	53000									
SAV-6-2003-Q2	43.21106	-73.57852	RS1-9190-ET342	1596204.20	737783.05	19.85	CORE	0	2	SI/FS/--/--	GRAY-BROWN; SLIGHT PCB-ODOR	0.46	64.7	53000									
SAV-6-2003-Q3	43.21124	-73.57849	RS1-9190-ET342	1596204.20	737783.05	82.44	CORE	0	2	SI/FS/--/--	GRAY-BROWN; SLIGHT PCB-ODOR	0.46	64.7	53000									
SAV-6-2003-Q4	43.21047	-73.57936	RS1-9190-ET369	1595998.50	737578.34	27.12	CORE	0	2	FS/--/SI/OR	DARK GRAY BROWN, ORGANICS/ROOTS & WOOD	0.99	39	11000									
SAV-6-2003-Q5	43.21056	-73.57911	RS1-9190-ET360	1596068.27	737620.77	31.04	CORE	0	2	SI/--/FS/OR	DARK BROWN	1.1	39.2	10000	2	24	FS/--/SI/OR	DARK BROWN, OR=WOOD PULP FS/-/SI/OR 2-9, GRAY BROWN FS/-/-/CS, GR, AND WOOD	0	0		2.72	Poorly Graded Sand with Silt
SAV-6-2003-Q6	43.21065	-73.57917	RS1-9190-ET360	1596068.27	737620.77	20.54	CORE	0	2	SI/--/FS/OR	DARK BROWN	1.1	39.2	10000	2	24	FS/--/SI/OR	DARK BROWN, OR=WOOD PULP FS/-/SI/OR 2-9, GRAY BROWN FS/-/-/CS, GR, AND WOOD	0	0		2.72	Poorly Graded Sand with Silt
SAV-6-2003-Q7	43.21080	-73.57920	RS1-9190-ET348	1596136.56	737576.32	19.57	CORE	0	2	OR/SI/--/--	BROWN; OR-PRIMARY WOOD PULP, SOME WOOD	0.17	82	250000									
SAV-6-2003-Q8	43.21096	-73.57930	RS1-9190-ET339	1596199.85	737541.66	27.19	CORE	0	2	MS/FS/SI/OR	GRAY BROWN, ORGANICS/ROOTS & WOOD	1.3	28	19000									

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Appendix G - Habitat Assessment Data (SAV-SSAP Other)

SAV Samples			Nearest 2002 - 2003 SSAP Cores					Surface Data								Subsurface Data								
Station Number	Latitude	Longitude	Core ID	Northing[1]	Easting[1]	Distance to Station (ft)	Sampling Technique	Sample Start Depth (in.)	Sample End Depth (in.)	Texture Description[2]	General Description	Bulk Density (g/cm^3)	Moisture Content (%)	TOC (mg/kg)	Sample Start Depth (in.)	Sample End Depth (in.)	Texture Description[2]	General Description	Liquid Limit	Plastic Limit	Plasticity Index	Specific Gravity	USCS Group Name
SAV-6-2003-Q9	43.21119	-73.57925	RS1-9190-ET330	1596270.29	737578.29	2.30	CORE	0	2	FS/CS/GR/OR	DARK BROWN	0.69	22	5100									
SAV-7-2003-Q1	43.20432	-73.58268	RS1-9089-WT159	1593781.77	736696.93	29.20	CORE	0	2	FS/SI/--/--	GRAY BROWN	1.1	32	8000									
SAV-7-2003-Q2	43.20398	-73.58302	RS1-9089-WT172	1593644.40	736620.28	25.70	CORE	0	2	SI/--/FS/--	BROWN. ODOR	0.97	39	13000									
SAV-7-2003-Q3	43.20333	-73.58346	RS1-9089-WS717	1593388.94	736511.23	23.84	CORE	0	2	FS/SI/--/--	DARK GREY BROWN. SLIGHT ODOR	1.3	27	6500									
SAV-7-2003-Q4	43.20305	-73.58356	RS1-9089-WS203	1593290.75	736494.39	34.56	CORE	0	2	SI/FS/--/--	GRAY-BROWN	1.1	31										
SAV-7-2003-Q5	43.20333	-73.58341	RS1-9089-WS717	1593388.94	736511.23	12.87	CORE	0	2	FS/SI/--/--	DARK GREY BROWN. SLIGHT ODOR	1.3	27	6500									
SAV-7-2003-Q6	43.20313	-73.58356	RS1-9089-WS203	1593290.75	736494.39	41.69	CORE	0	2	SI/FS/--/--	GRAY-BROWN	1.1	31										
SAV-7-2003-Q7	43.20270	-73.58375	RS1-9089-WS213	1593153.90	736421.14	12.41	CORE	0	2	SI/FS/CS/MS	BROWN. TRACE ORGANICS= VEGETATION, CLAM.	1	25	5400									
SAV-7-2003-Q8	43.20264	-73.58372	RS1-9089-WS213	1593153.90	736421.14	16.73	CORE	0	2	SI/FS/CS/MS	BROWN. TRACE ORGANICS= VEGETATION, CLAM.	1	25	5400									
SAV-7-2003-Q9	43.20240	-73.58381	RS1-9089-WT218	1593082.55	736381.42	34.94	CORE	0	2	FS/SI/MS/OR	DARK BROWN. OR= ROOTS.	0.80	40	27000									
SAV-8-2003-Q1	43.12687	-73.58714	RS2-8483-WT152	1565469.73	735817.93	45.97	CORE	0	2	FS/SI/--/OR	DARK BROWN; O-TWIGS, ROOTS	0.85	43.2	35000									
SAV-8-2003-Q2	43.12695	-73.58708	RS2-8483-WT152	1565469.73	735817.93	72.23	CORE	0	2	FS/SI/--/OR	DARK BROWN; O-TWIGS, ROOTS	0.85	43.2	35000									
SAV-8-2003-Q3	43.12710	-73.58708	RS2-8483-CT141	1565676.32	735855.37	85.82	CORE	0	2	OR/SI/--/--	BROWN; PRIMARILY WOOD & WOOD PULP	0.31	68.3	140000									
SAV-8-2003-Q4	43.12671	-73.58706	RS2-8483-WT152	1565469.73	735817.93	16.91	CORE	0	2	FS/SI/--/OR	DARK BROWN; O-TWIGS, ROOTS	0.85	43.2	35000									
SAV-8-2003-Q5	43.12679	-73.58704	RS2-8483-WT152	1565469.73	735817.93	24.50	CORE	0	2	FS/SI/--/OR	DARK BROWN; O-TWIGS, ROOTS	0.85	43.2	35000									
SAV-8-2003-Q6	43.12690	-73.58698	RS2-8483-WT152	1565469.73	735817.93	65.75	CORE	0	2	FS/SI/--/OR	DARK BROWN; O-TWIGS, ROOTS	0.85	43.2	35000									
SAV-8-2003-Q7	43.12771	-73.58537	RS2-8483-ET136	1565814.65	736257.76	22.48	CORE	0	2	SI/--/--/--	GRAY-BROWN	0.55	56.8	57000	2	12	SI/FS/OR/--	GRAY-BROWN; SOME WOOD & WOOD PULP; SLIGHT PCB-ODOR	45	0		2.46	Sandy Silt
SAV-8-2003-Q8	43.12766	-73.58543	RS2-8483-ET136	1565814.65	736257.76	9.54	CORE	0	2	SI/--/--/--	GRAY-BROWN	0.55	56.8	57000	2	12	SI/FS/OR/--	GRAY-BROWN; SOME WOOD & WOOD PULP; SLIGHT PCB-ODOR	45	0		2.46	Sandy Silt
SAV-8-2003-Q9	43.12737	-73.58519	RS2-8483-ET144	1565672.40	736338.53	32.74	CORE	0	2	FS/SI/OR/--	GRAY-BROWN; SOME WOOD; LITTLE ROOTS	1	39	16000	2	24	FS/SI/OR/--	GRAY-BROWN; LITTLE WOOD & WOOD PULP	0	0		2.47	Silty Sand
SAV-9-2003-Q1	43.13008	-73.59060	RS2-8483-WT076	1566648.93	734899.43	35.93	CORE	0	2	FS/SI/--/CL	BROWN; O-ROOTS	0.62	49	27000									
SAV-9-2003-Q2	43.13013	-73.59045	RS2-8483-WT076	1566648.93	734899.43	46.16	CORE	0	2	FS/SI/--/CL	BROWN; O-ROOTS	0.62	49	27000									
SAV-9-2003-Q3	43.13020	-73.59048	RS2-8483-WT076	1566648.93	734899.43	68.77	CORE	0	2	FS/SI/--/CL	BROWN; O-ROOTS	0.62	49	27000									
SAV-9-2003-Q4	43.13102	-73.58893	RS2-8483-ET046	1566996.80	735336.04	30.88	CORE	0	2	FS/--/--/SI	GRAY BROWN	1.2	19	6500									
SAV-9-2003-Q5	43.13092	-73.58868	RS2-8483-ET047	1566989.82	735417.79	35.26	CORE	0	2	SI/FS/OR/--	BROWN; SOME WOOD	0.91	46.4	15000	2	6	FS/OR/--/--	BROWN; SOME WOOD	0	0		2.68	Poorly Graded Sand
SAV-9-2003-Q6	43.13036	-73.58847	RS2-8483-ET069	1566786.00	735456.65	16.23	CORE	0	2	FS/SI/MS/OR	BROWN. OR= TWIGS, CLAM	1.1	30	9200	30	36	MS/CS/FS/OR	GREY RBOWN. OR= WOOD , WOOD PULP	0	0		2.72	Poorly Graded Sand with Silt
SAV-9-2003-Q7	43.13324	-73.58906	RS2-8584-ET133	1567824.87	735255.86	16.24	CORE	0	2	SI/OR/--/--	OLIVE BROWN, OR=VEG, TRACE SHEEN	0.26	75.6	150000									
SAV-9-2003-Q8	43.13331	-73.58918	RS2-8584-ET133	1567824.87	735255.86	33.81	CORE	0	2	SI/OR/--/--	OLIVE BROWN, OR=VEG, TRACE SHEEN	0.26	75.6	150000									
SAV-9-2003-Q9	43.13348	-73.58926	RS2-8584-ET130	1567895.80	735221.50	22.05	CORE	0	2	SI/--/FS/--	GRAY BROWN	0.62	52.8	34000	2	12	SI/--/FS/OR	GRAY BROWN, OR=WOOD AND VEG	52	43	9	2.31	Elastic Silt with Sand

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Appendix G - Habitat Assessment Data (SAV-SSAP Grain Size)

SAV Samples			2002 - 2003 SSAP Grain Size Analyses[2]													
Station Number	Latitude	Longitude	Core ID	Northing[1]	Easting[1]	Sampling Technique	% Clay	% Silt	% Fine Sand	% Medium Sand	% Coarse Sand	% Gravel	% Fines	% Sands	% Coarse	Distance to Station (ft)
SAV-2-2003-Q5	43.26015	-73.58798	RS1-9493-GP001	1614073.70	735067.20	GRAB	9.0	29.5	51.8	3.4	0.9	5.3	90.3	56.1	6.2	15.72
SAV-3-2003-Q4	43.25759	-73.58413	RS1-9493-GP004	1613083.60	736122.00	GRAB	1.8	10.5	10.0	21.6	11.7	44.4	22.3	43.3	56.1	84.77
SAV-4-2003-Q1	43.25108	-73.59117	RS1-9493-GP020	1610792.40	734316.20	GRAB	7.2	5.7	85.0	2.0	0.1	0.0	97.9	87.1	0.1	78.36
SAV-4-2003-Q2	43.25118	-73.59126	RS1-9493-GP020	1610792.40	734316.20	GRAB	7.2	5.7	85.0	2.0	0.1	0.0	97.9	87.1	0.1	98.86
SAV-4-2003-Q3	43.25122	-73.59108	RS1-9493-GP020	1610792.40	734316.20	GRAB	7.2	5.7	85.0	2.0	0.1	0.0	97.9	87.1	0.1	59.16
SAV-4-2003-Q7	43.24955	-73.59253	RS1-9493-GP021	1610182.90	733916.00	CORE	1.6	3.6	11.2	11.1	12.6	60.1	16.4	34.9	72.7	40.71
SAV-5-2003-Q1	43.22083	-73.58225	RS1-9190-GP003	1599757.80	736651.20	GRAB	1.2	13.0	12.1	12.7	30.5	30.4	26.3	55.3	60.9	88.37
SAV-5-2003-Q4	43.22080	-73.58246	RS1-9190-GP003	1599757.80	736651.20	GRAB	1.2	13.0	12.1	12.7	30.5	30.4	26.3	55.3	60.9	30.74
SAV-5-2003-Q5	43.22082	-73.58234	RS1-9190-GP003	1599757.80	736651.20	GRAB	1.2	13.0	12.1	12.7	30.5	30.4	26.3	55.3	60.9	65.16
SAV-5-2003-Q6	43.22019	-73.58183	RS1-9190-GP004	1599464.40	736824.50	GRAB	0.6	22.9	0.5	0.3	1.1	74.6	24.0	1.9	75.7	80.66
SAV-5-2003-Q7	43.22001	-73.58165	RS1-9190-GP004	1599464.40	736824.50	GRAB	0.6	22.9	0.5	0.3	1.1	74.6	24.0	1.9	75.7	78.83
SAV-6-2003-Q7	43.21080	-73.57920	RS1-9190-GP016	1596157.30	737503.90	CORE	7.4	3.0	61.4	12.7	8.2	7.3	71.8	82.3	15.5	93.94
SAV-6-2003-Q8	43.21096	-73.57930	RS1-9190-GP016	1596157.30	737503.90	CORE	7.4	3.0	61.4	12.7	8.2	7.3	71.8	82.3	15.5	65.54
SAV-6-2003-Q9	43.21119	-73.57925	RS1-9190-GP015	1596313.40	737624.30	CORE	8.1	20.2	61.3	7.4	2.6	0.4	89.6	71.3	3.0	65.18
SAV-7-2003-Q1	43.20432	-73.58268	RS1-9089-GP010	1593701.00	736671.70	CORE	4.2	5.4	34.1	2.1	1.9	52.2	43.7	38.1	54.1	55.43
SAV-7-2003-Q7	43.20270	-73.58375	RS1-9089-GP016	1593098.90	736370.20	CORE	4.9	25.5	68.1	1.5	0.0	0.0	98.5	69.6	0.0	75.11
SAV-7-2003-Q8	43.20264	-73.58372	RS1-9089-GP016	1593098.90	736370.20	CORE	4.9	25.5	68.1	1.5	0.0	0.0	98.5	69.6	0.0	63.09
SAV-7-2003-Q9	43.20240	-73.58381	RS1-9089-GP016	1593098.90	736370.20	CORE	4.9	25.5	68.1	1.5	0.0	0.0	98.5	69.6	0.0	54.64
SAV-8-2003-Q1	43.12687	-73.58714	RS2-8483-GP007	1565582.00	735826.00	GRAB	5.2	2.6	81.3	10.8	0.1	0.0	89.1	92.2	0.1	68.90
SAV-8-2003-Q2	43.12695	-73.58708	RS2-8483-GP007	1565582.00	735826.00	GRAB	5.2	2.6	81.3	10.8	0.1	0.0	89.1	92.2	0.1	40.40
SAV-8-2003-Q3	43.12710	-73.58708	RS2-8483-GP007	1565582.00	735826.00	GRAB	5.2	2.6	81.3	10.8	0.1	0.0	89.1	92.2	0.1	14.95
SAV-8-2003-Q5	43.12679	-73.58704	RS2-8483-GP007	1565582.00	735826.00	GRAB	5.2	2.6	81.3	10.8	0.1	0.0	89.1	92.2	0.1	96.30
SAV-8-2003-Q6	43.12690	-73.58698	RS2-8483-GP007	1565582.00	735826.00	GRAB	5.2	2.6	81.3	10.8	0.1	0.0	89.1	92.2	0.1	61.78

Notes:

All SSAP is based on the February 3, 2004 version of QEA Export.

1. SSAP coordinates are in NAD83 NY State Plane East (feet).

2. SSAP Grain Size Analysis samples >100 ft. from Station are not listed.

Fines = % clay + % silt + % fine sand

Sands = % fine sand + % medium sand + % coarse sand

Coarse = % coarse sand + % gravel

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Appendix G - Habitat Assessment Data (Shoreline-Assessment Data)

									Inorganic Shoreline Substrate Components							Organic Shoreline Substrate Components					Bank Assessment Components				Bank Vegetation Components				Riparian Edge - Cover Components				
Station	River Section	Northing Offshore	Easting Offshore	Northing Top of Bank	Easting Top of Bank	Distance A to B (m)	Bank Slope %	Bedrock	Boulder	Cobble	Gravel	Sand	Silt	Clay	Detritus	Muck-Mud	Marl	Vegetated	Woody Debris (ft.)	Stable	Mod. Stable	Mod. Unstable	Unstable	Optimal	Suboptimal	Marginal	Poor	Canopy	Understory	Herbaceous	Adjacent Landuse	Dominant Species
SHO-01R-2003-01A, B	REF	492601.870	223621.511	492598.532	223619.576	5.8	<10					60	40	Trace	20	80			15x1, (2)20x1, 10x1, 25x1, (6)6x1		90	10		100				40	20	100	Forested, non-resident, non-commercial	Elm, Maple, Dogwood, Grasses, Ferns
SHO-01R-2003-02A, B	REF	492539.962	223677.190	492535.825	223671.324	5.7	15			10	60	30	Trace		20	80			15x1, 30x1, 15x.5		90	10		100				60	20	80	Forested, non-resident, non-commercial	Cottonwood, Maple, Elm, Sycamore, Dogwood, Bittersweet
SHO-01R-2003-03A, B	REF	492499.558	223725.762	492497.054	223720.307	5.3	22			20	50	30	Trace		10	90			10x1, 25x1		90	10		100				70	40	30	Forested, non-resident, non-commercial	Cottonwood, Birch, Dogwood, Ferns, Grasses
SHO-02R-2003-01A, B	1	487274.183	224728.163	487279.750	224732.540	5.5	38				20	80	Trace		40	60		Trace	10x.5, 15x.5	90	10			90	10			10	20	80	Maintained land - Res	Maple, Ash, Alder, Pine, Blk Cherry, Honeysuckle, Grape, Dogwood, Elm, Jewelweed
SHO-02R-2003-02A, B	1	487256.720	224737.038	487255.188	224741.210	3.5	45				Trace	100	Trace		60	40			15x1, (12)8x.25, 12x.5	90	10			100				70	50	80	Maintained land - Res	Blk Cherry, Ash, Maple, Honeysuckle, Sumac, Va Creeper, Grape, Mullen, Grasses
SHO-02R-2003-03A, B	1	487214.498	224738.974	487210.895	224744.306	5.0	23		Trace		Trace	80	20		20	80			10x2, 12x1, 15x.75, 15x.5	90	10			90	10			80	50	30	Maintained land - Res	Maple, Ash, Elm, Honeysuckle, Dogwood, Blk Cherry, Jewelweed, Horsetail, Fern, Grasses
SHO-03R-2003-01A, B	2	478058.528	223859.528	478059.323	223853.851	5.0	28				20	50	10	20		Trace	100	Trace	15x1, 10x.5, 15x.5, 50x1, 50x.75, 10x1, (6)1x.5		20	80		60	20	20		10	30	60	Forested, non-resident, non-commercial	Basswood, Pine, Elm, Alder, Maple, Ash, Dogwood, Goldenrod, Grasses, Smartweed, Horsetail, Ferns
SHO-03R-2003-02A, B	2	477959.213	223860.287	477957.560	223853.391	5.0	24				Trace	20	40	40		Trace	100	Trace (Algae)	(3)20x3, 1x6, 25x8	20	80			100				50	70	70	Forested, non-resident, non-commercial	Pine, Maple, Ash, Oak, Hemlock, Dogwood, Alder, Elm, Blk Cherry, Basswood, Grasses, Va Creeper, Groundnut
SHO-03R-2003-03A, B	2	477836.864	223874.374	477833.582	223868.475	5.0	30			Trace	10	50	10	20	20	Trace	80	Trace	(20)30x.8, (10)15x.5, (2)20x.7, 40x1, (4)10x.3.75, (6)15x6, (11)10x6, 30x1, 35x1.5	20	80			100				30	70	60	Forested, non-resident, non-commercial	Pine, Maple, Ash, Hemlock, Elm, Dogwood, Sumac, Grape, Witch Hazel, Fern, Grasses, Aster
SHO-01I-2003-01A, B	1	492268.617	223919.400	492264.185	223914.777	5.5	21					40	20	40	20	60		20	15X.5, 10X1, (3)20X.5, 40X1, 15X.5	90	10			100				40	20	80	Forested, non-resident, non-commercial	Cottonwood, Maple, Blk Cherry, Elm, Bittersweet, Fern, Grape, Grasses, Loosestrife
SHO-01I-2003-02A, B	1	492211.283	223940.725	492212.214	223932.503	5.5	16					20	40	40	10	80		10	12x1, 10x.5, 15x.5, (2)25x.5	90	10			100				30	Trace	90	Forested, non-resident, non-commercial	Elm, Maple, Bittersweet, Fern, Grape, Grasses, Queen Annes Lace, Goldenrod
SHO-01I-2003-03A, B	1	492118.634	223981.765	492115.011	223979.144	5.2	N/A					30	50	20	Trace	80		20	15x1, 4x1.5, 15x1.5, 10x1	80	20			100				Trace	10	90	Forested, non-resident, non-commercial	Elm, Sumac, Loosestrife, Goldenrod, Grape, Bittersweet, Grasses, Fern, Arrowhead
SHO-02I-2003-01A, B	1	491991.775	224170.549	491992.575	224176.281	5.4	20					90	10		Trace	100			30x1, 15x1, 50x1	80	20			100				60	60	50	Forested, non-resident, non-commercial	Maple, Elm, Blk Cherry, Honeysuckle, Fern, Jewelweed, Grape
SHO-02I-2003-02A, B	1	491926.923	224173.971	491929.551	224176.632	5.5	40					90	10		10	90			8x.5, 15x2	80	20			100				30	80	30	Forested, non-resident, non-commercial	Elm, Maple, Honeysuckle, Bittersweet, Grasses, Clover, Grape
SHO-02I-2003-03A, B	1	491853.244	224191.464	491858.837	224197.351	5.8	11					80	20		Trace	100			None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	100	Trace	10	Forested, non-resident, non-commercial	Maple, Fern, Grasses
SHO-03I-2003-01A, B	1	491999.170	224439.598	491999.376	224446.057	5.0	45					60	30	10	20	50		30	40x1, 25x.5, (3)15x.5		90	10		100				80	70	50	Forested, non-resident, non-commercial	Box Elder, Blk Cherry, Ash, Cottonwood, Honeysuckle, Sumac, Va Creeper, Grape, Rasberry, Grasses
SHO-03I-2003-02A, B	1	491902.793	224452.726	491903.070	224458.947	5.0	50					60	30	10	30	60		10	30x1, 20x1, 50x1, (5)10x.5		90	10		100				60	20	80	Forested, non-resident, non-commercial	Ash, Maple, Basswood, Elm, Blk Cherry, Grape, Va Creeper, Grasses
SHO-03I-2003-03A, B	1	491830.033	224456.180	491831.155	224460.562	5.0	50					80	10	10	20	80		Trace	10x2.5, 15x.5, 40x1		90	10		100				50	60	70	Forested, non-resident, non-commercial	Basswood, Ash, Box Elder, Maple, Honeysuckle, Grape, Buckthorn, Barberry, Sumac, Jewelweed, False Solomons Seal, Va Creeper
SHO-04I-2003-01A, B	1	491762.442	224380.052	491766.950	224374.306	5.5	21			Trace	10	90	Trace		10	90		Trace	30x1, (2)15x.5		70	30		100				70	80	90	Fill, Open Lot	Ash, Cottonwod, Catalpa, Maple, Buttonbush, Dogwood, Ferns, Va Creeper, Grasses, Clearweed
SHO-04I-2003-02A, B	1	491688.378	224345.875	491693.633	224341.068	6.0	28				10	90			20	80		Trace	8x.5, 10x1		90	10		100				20	40	90	Fill, Open Lot	Elm, Maple, Willow, Cottonwood, Sumac, Elderberry, Grape, Va Creeper, Snakeroot, Fern, Grasses, Cottonwod
SHO-04I-2003-03A, B	1	491637.379	224304.916	491638.687	224299.686	5.5	19				10	90			10	90		Trace	15x.5		70	30		100				30	10	100	Fill, Open Lot	Maple, Ash, Dogwood, Buttonbush, Sumac, Alder,Oak, Sneezeweed, Joe-pye Weed, Grasses, Fern, Goldenrod
SHO-05I-2003-01A, B	1	487033.503	224555.373	487029.908	224551.025	5.0	11			20	50	30					100 (Shale)		None	100					100 (Shale on bank)			70	90	80	Trails, Boat Launch	Catalpa, Cottonwood, Blk Locust, Ash, Maple, Honeysuckle, Bittersweet, Dogwood, Buttonbush, Grasses, Fern, Spirea, Grape, Va Creeper, Joe-pye Weed, Groundnut
SHO-05I-2003-02A, B	1	486973.702	224560.616	486975.788	224555.643	5.0	16			20	50	30					100 (Shale)		None	100					100 (Shale on bank)			80	40	70	Trails	Maple, Cottonwood, Ash, Dogwood, Grape, Honeysuckle, Va Creeper, Grasses
SHO-05I-2003-03A, B	1	486924.515	224562.692	486926.090	224557.079	5.0	26		Trace	20	50	30					100 (Shale)		None	100				20	80 (Shale on bank)			70	30	50	Trails, Road	Ash, Cottonwood, Maple, Elm, Honeysuckle, Dogwood, Alder, Poison Ivy, Snakeroot, Aster, Grasses, Grape, Va Creeper
SHO-06I-2003-01A, B	1	486859.338	224741.185	486858.450	224746.346	4.0	44		Trace	10	70	30			Trace	10	90 (Shale)	Trace	None	100				90	10			50	Trace	60	Res to Bank, Maintained	Blk Locust, Elm, Ash, Sumac, Grasses, Grape, Burdock, Mosses, Clover
SHO-06I-2003-02A, B	1	486768.768	224770.266	486770.077	224777.369	5.0	34				10	80	10		40	40	20 (Shale)		60x2.5, 20x.5, (4)8x.25	60	40			100				70	30	60	Res to Bank, Maintained	Maple, Ash, Blk Locust, Willow, Elm, Dogwood, Honeysuckle, Sneezeweed, Jewelweed, Grape, Loosestrife, Goldenrod, Turtlehead
SHO-06I-2003-03A, B	1	486698.187	224794.277	486701.889	224799.922	5.0	N/A				10	90	Trace		20	70	10 (Shale)	Trace	(3)8x.5	100				100				80	40	70	Res to Bank, Maintained	Elm, Ash, Maple, Dogwood, Alder, Honeysuckle, Fern, Sneezeweed, Turtlehead, Grasses, Mosses, Goldenrod
SHO-07I-2003-01A, B	1	486157.492	224376.332	486155.733	224380.885	5.0	25					Trace	100	Trace	10	60		30	(2)8x.5, (3)30x.5		30	70		100				80	70	40	Maintained Field, Airstrip	Maple, Elm, Honeysuckle, Dogwood, Ash, Grape, Ferns, Clover, Va Creeper, Horsetail, Clearweed, Grasses
SHO-07I-2003-02A, B	1	486119.120	224371.599	486118.716	224376.239	4.0	20					Trace	100	Trace	10	60		30	None		20	80		100				70	80	40	Maintained Field, Airstrip	Maple, Ash, Elm, Dogwood, Honeysuckle, Grape, Ferns, Clearweed, Jewelweed, Grasses, Water Horsetail, Va Creeper
SHO-07I-2003-03A, B	1	486079.510	224366.639	486078.896	224376.061	4.0	14					Trace	100	Trace	10	60		30	(4)6x.2, 4x.5		30	70		100				80	90	50	Maintained Field, Airstrip	Willow, Maple, Elm, Ash, Dogwood, Honeysuckle, Elderberry, Alder, Grape, Grasses, Ferns, Clearweed, Jewelweed, False Solomon's Seal
SHO-08I-2003-01A, B	1	486149.379	224888.421	486145.776	224893.551	5.0	14			30	30	30	10		Trace	20	80	10	N/A (Maintained)	100				50	30	20		Trace	20	100	County Road/ Residential Lots	Ash, Maple, Honeysuckle, Elderberry, Alder, Willow, Grape, Dogwood, Elm, Grasses, Goldenrod, Raspberry, Loosestrife, Jewelweed, Va Creeper, Queen Annes Lace

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Appendix G - Habitat Assessment Data (Shoreline-Assessment Data)

									Inorganic Shoreline Substrate Components							Organic Shoreline Substrate Components					Bank Assessment Components				Bank Vegetation Components				Riparian Edge - Cover Components				
Station	River Section	Northing Offshore	Easting Offshore	Northing Top of Bank	Easting Top of Bank	Distance A to B (m)	Bank Slope %	Bedrock	Boulder	Cobble	Gravel	Sand	Silt	Clay	Detritus	Muck-Mud	Marl	Vegetated	Woody Debris (ft.)	Stable	Mod. Stable	Mod. Unstable	Unstable	Optimal	Suboptimal	Marginal	Poor	Canopy	Understory	Herbaceous	Adjacent Landuse	Dominant Species
SHO-08I-2003-02A	1	486093.551	224842.055	No Point Taken	No Point Taken	3.0	80			Trace	70	20	10				100		15x.5, (6)6x.25	80	10	10		100				30	40	70	County Road/ Residential Lots	Elm, Sumac, Ash, Basswood, Honeysuckle, Grape, Goldenrod, Grasses, Jewelweed, Clover, Moss, Lily, Va Creeper
SHO-08I-2003-03A, B	1	486056.079	224826.354	486058.210	224833.199	5.0	30	20 (Shale)		10	60	10					100		20x2	90	10			60	40			10	60	60	County Road/ Residential Lots	Maple, Ash, Alder, Elm, Sumac, Dogwood, Honeysuckle, Grape, Sneezeweed, Loosestrife, Va Creeper, Turtlehead
SHO-09I-2003-01A, B	2	477717.905	223907.296	477716.642	223901.765	5.0	40				10	50	10	30	40	10	50	Trace	(7)12x.5, (3)10x.5, 10x1	10	90			100				40	70	70	Forested, non-resident, non-commercial	Maple, Pine, Basswood, Sumac, Honeysuckle, Dogwood, Juniper, Grape, Grasses, Loosestrife, Jewelweed
SHO-09I-2003-02A, B	2	477638.550	223929.154	477635.793	223929.708	5.0	26				10	50	10	30	10	10	80	Trace (Algae)	(2)10x.5, 50x1	60	40			100				80	50	20	Forested, non-resident, non-commercial	Maple, Ash, Basswood, Willow, Pine, Dogwood, Honeysuckle, Grape, Buckthorn, Loosestrife, Grasses, Va Creeper
SHO-09I-2003-03A, B	2	477585.326	223949.416	477584.239	223942.666	5.0	25			Trace	30	40	Trace	30	10	10	80	Trace (Algae)	6x1, (2)10x.5, 10x.3	70	30			100				60	60	40	Forested, non-resident, non-commercial	Willow, Maple, Else Ash, Sumac, Honeysuckle, Dogwood, Grape, Grasses, Moss, Clover, Loosestrife, Ferns, Va Creeper, Goldenrod
SHO-10I-2003-01A, B	1	485868.502	224586.979	485872.939	224581.369	5.0	20					80	20		10	Trace	90 (Sand)		25x2, 10x1, 8x1, (3)10x.5, (2)15x.5	20	50	30		100				80	20	60	Maintained land - Res	Maple, Ash, Grape, Honeysuckle, Blk Cherry, Elm, Dogwood, Fern, Snakeroot, Grasses, Evening Primrose
SHO-10I-2003-02A, B	1	485787.619	224542.215	485791.370	224536.569	5.0	10					80	20		Trace	Trace	100 (100)		8x.5, (2)6x.3, (3)6x.1	40	40	20		100				70	30	60	Maintained land - Res	Maple, Ash, Elm, Dogwood, Honeysuckle, Ferns, Jewelweed, Grasses, Calico Aster
SHO-10I-2003-03A, B	1	485721.785	224501.837	485732.170	224492.008	N/A	N/A					80	20		Trace	Trace	100 (100)		8x.5, (2)3x.2,	80	20			100				80	20	80	Maintained land - Res	Maple, Ash, Elm, Willow, Dogwood, Button Bush, Honeysuckle, Alder, Grasses, Ferns, Loosestrife
SHO-11I-2003-01A, B	1	477259.175	224426.865	477263.373	224433.020	4.0	<10					20	50	30	20	20	60 (Clay/Silt)	Trace	10x.25, (3)10x.5	70	30			50	50			90	10	80	Forested, non-resident, Maintained - Comm.	Maple, Ash, Grasses, Clearweed, Ferns, Mosses, Jewelweed, Beggars Tick, Pickerel Weed
SHO-11I-2003-02A, B	1	477214.027	224450.717	477219.350	224450.920	5.0	<10					20	50	30	20	20	50 (Clay/Silt)	10	(3)10x.5, 15x1, (2)6x.25	80	20			20	80			90	Trace	70	Forested, non-resident, Maintained - Comm.	Maple, Willow, Ash, Catalpa, Grasses, False Nettle, Ferns, Mosses, Beggars Tick
SHO-11I-2003-03A, B	1	477136.668	224481.964	477136.333	224487.778	5.0	17					20	60	20	Trace	20	40	40	(2)20x1, 15x.7, 10x.8	90	10			100				60	50	90	Forested, non-resident, Maintained - Comm.	Maple, Cottonwood, Blk Locust, Mox Elder, Dogwood, Alder, Sumac, Goldenrod, Loosestrife, Queen Annes Lace, Grasses, Lurid Sedge, Bullrush, Clotspur, Va Creeper, Grape, Jewelweed

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Appendix G - Habitat Assessment Data (Wetland-Assessment Data)

						STEM LENGTHS										STEM DIAMETER									
Wetland Number	Quadrat	Species	Live/Dead	Biomass	No. Stems	Stem1	Stem2	Stem3	Stem4	Stem5	Stem6	Stem7	Stem8	Stem9	Stem10	Stem1	Stem2	Stem3	Stem4	Stem5	Stem6	Stem7	Stem8	Stem9	Stem10
1	1	Se	D	12.71																					
1	1	Se	L	228.99	38	139	41.8	34	158.6	140.8	119.1	96.5	137.4	105	143.5	2.01	1.79	1.59	1.98	2.09	2.75	2.08	2.68	1.84	2.55
1	1	Za	L	44.92	43	143.5	147.2	162.4	142.4	103.9	138.2	114.0	158.8	114.1	112.8	0.52	0.90	0.44	0.50	0.44	0.57	0.30	0.59	0.36	0.31
1	1	Sl	L	13.75	10	56.30	32.80	49.80	35.00	50.30	53.20	35.00	49.00	27.90	44.80	0.86	0.83	0.62	0.38	0.31	0.43	0.30	0.37	0.35	0.35
1	2	Se	D	27.4																					
1	2	Se	L	286.59	48	124.4	139.1	151.8	144.8	161.0	128.8	133.5	101.8	86.2	148.0	2.43	2.69	1.83	1.87	2.05	1.69	2.30	0.75	1.25	1.61
1	2	Za	L	20.24	12	157.1	181.0	177.4	99.2	107.6	162.8	91.2	116.4	147.4	121.5	0.34	0.45	0.38	0.24	0.21	0.45	0.20	0.35	0.44	0.40
1	3	Se	D	9.71																					
1	3	Se	L	160.51	24	92.2	96.0	98.4	104.8	97.3	101.4	91.1	96.6	113.0	99.8	0.47	1.33	2.63	2.06	1.63	2.66	1.07	1.51	1.01	2.13
1	3	Za	L	42.72	17	182.0	99.8	148.6	145.0	153.0	172.0	115.1	89.5	162.6	128.8	0.59	0.35	0.43	0.43	0.41	0.42	0.32	0.44	0.46	0.33
1	4	Se	D	85.99																					
1	4	Se	L	417.5	59	121.1	153.3	160.0	167.3	147.6	129.8	142.8	128.8	125.4	124.5	1.62	2.48	2.26	1.79	2.08	1.99	1.99	2.66	1.67	1.97
1	4	Lo	L	3.55	15	80.1	63.2	82.8	60.1	43.4	32.0	74.0	60.8	32.3	58.5	0.17	0.17	0.08	0.88	0.06	0.09	0.07	0.15	0.05	0.05
1	5	Se	D	31.54																					
1	5	Se	L	401.49	59	107.2	130.4	156.6	126.0	122.4	105.7	105.6	131.5	130.4	138.6	0.19	1.41	1.96	1.30	2.03	1.17	1.08	1.66	1.35	1.62
1	5	Za	L	30.16	10	216.4	169.2	166.2	172.4	179.2	85.6	133.2	108.6	156.0	133.1	0.86	0.46	0.66	0.58	0.39	0.68	0.33	0.29	0.46	0.66
1	5	Lo	L	1.21	4	67.2	49.8	34.2	78.2							0.06	0.05	0.06	0.02						
1	5	Ew	L	0.76	2	49.0	38.2									0.21	0.16								
1	6	Se	D	38.18																					
1	6	Se	L	457.36	49	135.4	152.0	144.1	153.5	144.3	154.1	138.8	119.8	107.6	129.8	2.01	2.65	2.58	2.51	1.99	2.44	1.97	1.13	1.71	1.73
1	6	Za	L	7.06	12	109.5	163.2	102.2	89.8	107.3	151.5	174.2	153.3	32.2	115.8	0.36	0.38	0.44	0.29	0.38	0.45	0.45	0.42	0.16	0.38
1	6	Sr	L	0.37	2	13.2	18.2									0.28	0.52								
1	7	Se	D	12.12																					
1	7	Se	L	139.07	33	119.6	113.8	128.6	121.6	104.5	117.0	105.8	127.1	114.6	75.6	2.15	1.95	1.86	1.92	1.13	1.60	2.09	3.18	2.01	0.89
1	7	Za	L	25.72	14	141.2	154.3	114.2	136.8	69.1	141.2	155.8	184.7	94.1	132.2	0.43	0.45	0.48	0.34	0.30	0.42	0.46	0.61	0.47	0.53
1	7	Lo	L	0.75	8	74.1	23.2	50.6	34.0	53.4	30.5	25.4	17.5			0.02	0.04	0.10	0.14	0.13	0.15	0.07	0.11		
1	8	Se	D	22.61																					
1	8	Se	L	287.47	64	121.2	122.8	127.6	107.0	139.2	130.5	118.2	120.1	145.0	142.1	1.47	1.20	1.69	1.53	1.61	2.29	1.33	1.71	1.55	1.45
1	8	Za	L	28.27	15	151.0	88.5	79.4	53.3	158.4	123.1	147.6	129.0	181.2	103.5	0.49	0.19	0.11	0.17	0.39	0.33	0.38	0.59	0.55	0.45
1	9	Se	D	12.34																					
1	9	Se	L	134.5	36	88.1	100.3	107.6	128.2	105.6	133.2	101.2	111.6	130.8	132.2	1.35	1.69	2.13	2.22	2.12	2.81	2.02	1.46	2.69	2.85
1	9	Za	L	22.6	16	153.2	105.2	152.7	131.2	175.2	158.8	86.2	176.8	122.8	77.0	0.43	0.38	0.37	0.53	0.86	0.53	0.31	0.46	0.37	0.32
1	9	Sl	L	1.89	4	53.5	38.2	64.2	53.0							0.50	0.52	0.59	0.70						
2	1	Sl	D	7.59																					
2	1	Sl	L	226.32	384	57.0	75.6	57.2	64.5	59.2	62.2	71.8	52.2	52.6	77.8	0.43	1.25	0.64	0.62	0.60	0.60	0.79	0.64	1.01	0.56
2	1	Pc	D	28.16																					
2	1	Pc	L	163.54	128	56.2	76.4	67.6	90.2	66.0	72.1	55.1	81.9	65.1	73.2	1.11	1.42	1.10	0.87	1.32	1.08	0.72	0.94	1.12	1.04
2	2	Sl	D	9.92																					
2	2	Sl	L	170.62	291	53.2	59.5	51.2	51.4	37.6	63.2	39.5	43.7	52.8	67.0	0.34	0.83	0.62	0.49	0.36	0.98	0.53	0.69	0.62	0.98
2	2	Lo	L	7.03	22	57.90	41.10	75.20	38.40	49.50	55.60	68.40	36.40	34.00	48.20	0.23	0.11	0.13	0.16	0.17	0.08	0.20	0.15	0.13	0.14
2	2	Pc	D	73.67																					
2	2	Pc	L	335.38	161	74.5	87.7	66.5	84.5	71.2	70.2	96.5	74.5	65.0	75.5	1.88	1.52	1.04	1.48	1.76	1.40	1.42	1.58	1.69	1.33
2	3	Sl	L	336.18	510	79.2	82.4	60.0	84.6	87.8	71.0	44.4	72.0	66.8	68.2	1.22	1.73	0.77	0.99	0.91	0.67	0.57	0.61	0.52	0.55
2	3	Lo	L	4.84	16	29.80	46.00	41.20	53.20	50.10	36.60	30.20	19.20	33.50	41.00	0.14	0.24	0.12	0.17	0.07	0.02	0.09	0.02	0.09	0.14
2	3	Pc	L	230.47	113	86.5	88.0	89.2	58.3	94.9	64.2	97.2	77.4	83.6	80.4	1.80	1.87	1.71	1.04	1.04	1.19	1.57	1.55	1.22	1.95
2	4	Pa	L	783.38	135	106.3	196.7	152.2	114.5	170.2	172.0	86.2	151.4	182.5	155.2	0.60	0.55	0.50	0.58	0.53	0.45	0.23	0.43	0.43	0.56
2	5	Pa	L	392.17	110	157.9	141.3	127.2	125.0	126.4	134.3	84.5	151.2	136.1	158.0	0.60	0.49	0.47	0.65	0.52	0.60	0.16	0.64	0.56	0.72
2	5	Ls	L	43.62	4	111.2	113.4	116.3	107.0							0.57	0.52	0.61	0.57						

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Appendix G - Habitat Assessment Data (Wetland-Assessment Data)

						STEM LENGTHS										STEM DIAMETER									
Wetland Number	Quadrat	Species	Live/Dead	Biomass	No. Stems	Stem1	Stem2	Stem3	Stem4	Stem5	Stem6	Stem7	Stem8	Stem9	Stem10	Stem1	Stem2	Stem3	Stem4	Stem5	Stem6	Stem7	Stem8	Stem9	Stem10
2	6	Pa	L	521.04	124	108.2	127.4	105.0	111.6	127.4	130.3	164.2	132.2	121.0	104.2	0.52	0.58	0.41	0.37	0.54	0.52	0.64	0.62	0.64	0.50
2	7	Se	D	31.64																					
2	7	Se	L	429.61	47	138.2	117.5	112.1	118.8	136.6	162.0	118.4	127.1	123.4	118.4	3.03	2.15	2.71	2.47	2.89	2.92	2.79	2.40	2.25	2.05
2	7	Pc	D	0.65												0.75	0.59	1.14	1.32						
2	7	Pc	L	11.88	4	37.2	34.0	55.8	88.0																
2	8	Se	D	39.13																					
2	8	Se	L	748.41	76	167.4	155.6	153.0	157.4	156.4	139.8	143.4	151.9	181.8	171.1	1.38	1.77	1.75	2.04	1.96	1.88	1.49	1.88	2.37	2.38
2	8	Sl	D	41.52																					
2	8	Sl	L	15.49	9	50.0	78.1	59.6	85.8	82.0	69.2	62.0	89.3	79.1		0.51	0.86	0.36	1.07	1.10	0.85	0.61	0.89	0.80	
2	9	Se	D	73.08																					
2	9	Se	L	499.28	48	155.2	130.5	186.0	153.4	168.2	113.4	117.8	144.0	164.2	151.8	2.71	2.64	2.61	2.05	2.19	1.58	1.61	1.72	2.08	2.94
2	9	Sl	L	0.71	1	52.2										0.87									
2	9	Lo	L	1.34	6	61.0	44.1	56.2	30.5	49.1	20.2					0.60	0.10	0.11	0.03	0.02	0.05				
2	9	Pc	D	5.71																					
2	9	Pc	L	22.92	20	90.5	66.7	82.3	45.8	98.2	68.9	56.1	54.0	40.0	86.1	0.89	1.01	0.98	1.76	0.86	0.85	0.86	0.93	0.39	1.90
3	1	Pv	L	1.89	38																				
3	1		L	1.14																					
3	1	Se	L	5.36	9																				
3	1	Lo	D	9.39																					
3	1	Lo	L	102.43	888	42.1	38.2	58.0	55.3	55.3	79.2	41.2	34.8	42.3	48.0	0.08	0.06	0.09	0.01	0.05	0.07	0.04	0.08	0.04	0.04
3	1	Pc	L	0.35	2																				
3	1	Ew	L	66.19	73	89.0	43.2	96.1	89.4	104.3	110.7	96.2	96.4	141.3	128.7	0.41	0.31	0.28	0.33	0.33	0.34	0.27	0.39	0.61	0.50
3	1	Er	L	0.13	22																				
3	1	Ap	L	1.08	5																				
3	2	Pv	L	5.6	14																				
3	2	Lo	D	5.6																					
3	2	Lo	L	265.37	1532	28.2	58.3	41.2	63.0	38.0	62.3	51.2	40.3	58.2	30.3	0.08	0.04	0.11	0.03	0.08	0.07	0.07	0.07	0.06	0.03
3	2	Pc	L	0.65	4																				
3	2	Ew	L	70.94	60	96.3	106.3	85.0	80.1	110.4	75.4	65.0	65.3	77.0	115.2	0.40	0.46	0.49	0.44	0.73	0.38	0.46	0.41	0.34	0.58
3	2	Ap	L	0.07	1																				
3	3	Pv	L	3.7	27																				
3	3	Se	L	3.32	8																				
3	3	Lo	D	1.47																					
3	3	Lo	L	79.75	754	41.0	35.0	32.2	32.2	39.2	32.4	52.2	49.0	48.0	32.9	0.06	0.05	0.08	0.04	0.06	0.11	0.12	0.09	0.05	0.05
3	3	Ew	L	32.13	59	103.2	49.8	65.0	82.8	50.3	42.3	74.1	75.3	35.0	78.3	0.49	0.32	0.20	0.33	0.30	0.22	0.46	0.30	0.25	0.19
4	1	Tl	L	323.84	19	157.2	158.2	147.2	184.2	194.5	184.5	176.2	176.3	118.4	162.8	2.44	2.03	2.87	3.57	3.03	2.85	2.22	2.50	1.94	2.55
4	1	Se	L	4.72	1	100.5										0.68									
4	2	Za	L	761.28	28	142.0	203.0	208.0	190.4	185.4	179.2	178.2	185.0	174.8	167.8	1.83	3.75	3.33	2.51	1.96	2.86	2.44	1.88	2.96	2.54
4	2	Se	L	2.65	2	54.5	70.8									1.51	1.16								
4	2	Sl	L	0.93	13	30.5	25.8	23.1	15.2	20.1	18.0	14.9	19.1	16.2	18.9	0.21	0.23	0.36	0.15	0.13	0.12	0.21	0.23	0.15	0.21
4	3	Tl	L	464.27	11	169.0	173.0	188.2	215.2	216.3	201.6	190.8	201.7	179.4	170.3	2.62	2.58	3.23	4.52	4.69	2.48	3.39	2.93	3.43	1.49
4	3	Sv	L	8.7	9	73.2	112.0	172.5	127.9	156.2	174.5	103.6	71.8	111.3		0.69	0.40	0.77	0.36	0.58	0.59	0.44	0.65	0.31	
4	3	Se	D	45.39																					
4	3	Se	L	92.01	13	122.5	95.1	153.0	151.6	162.2	129.6	151.5	103.0	74.8	125.2	1.12	0.56	1.11	0.72	0.58	0.63	0.90	0.88	0.81	0.24
4	3	Sl	L	3.24	9	54.5	42.2	53.0	57.2	44.2	46.5	34.2	39.2	15.2		0.81	0.31	0.56	0.44	0.57	0.56	0.43	0.39	0.14	
4	3	Pc	L	14.46	19	88.2	59.8	101.2	83.5	65.5	78.1	89.4	69.0	65.5	72.5	1.60	1.04	1.07	1.03	1.43	1.01	1.14	1.13	0.79	0.76
4	4	Se	L	279.03	16	166.5	157.3	179.5	169.0	158.6	150.2	147.8	147.0	164.8	157.3	0.82	1.93	1.66	2.10	1.89	1.35	1.17	0.87	1.35	1.17
4	4	Lo	L	0.47	1	107.0										0.13									
4	5	Ar	L	0.43	1	47.5										0.23									
4	5	Xc	L	0.4	1	41.2										0.42									
4	5	Se	L	433.03	41	193.6	181.1	186.2	166.4	150.4	174.0	173.8	169.2	149.6	172.3	1.79	2.02	1.52	1.19	1.82	2.77	1.25	1.31	1.02	1.45
4	5	Sl	L	1.34	4	37.2	38.8	49.2	16.0							0.70	0.16	0.33	0.40						

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Wetland Number	Quadrat	Species	Live/Dead	Biomass	No. Stems	Stem1	Stem2	Stem3	Stem4	Stem5	Stem6	Stem7	Stem8	Stem9	Stem10	Stem1	Stem2	Stem3	Stem4	Stem5	Stem6	Stem7	Stem8	Stem9	Stem10
4	5	Pc	L	0.46	3	56.6	70.0	55.8								0.57	0.67	0.72							
4	6	Se	L	391.69	53	157.7	171.1	144.2	151.0	159.5	193.4	169.8	153.3	155.6	158.9	1.08	2.61	1.05	1.44	1.49	1.48	1.20	1.56	1.06	1.81
4	6	Sl	L	0.58	5	58.6	22.0	14.0	17.5	15.6						0.45	0.05	0.04	0.16	0.12					
4	7	Se	L	30.85	10	126.2	95.2	95.0	105.2	100.6	95.3	113.8	84.0	123.4	93.0	1.14	0.74	0.54	0.77	1.08	0.61	0.78	0.72	0.91	0.71
4	7	Pc	L	167.61	65	96.0	111.6	120.0	76.8	80.5	78.5	79.2	81.2	97.1	78.4	1.15	1.27	1.33	0.75	1.16	1.11	1.22	0.88	1.04	1.08
4	8	Se	L	22.11	12	59.1	56.6	92.9	62.0	83.1	47.5	78.4	76.9	82.4	82.8	0.43	0.49	0.77	0.60	0.81	0.48	0.88	0.72	1.18	0.60
4	8	Pc	L	162.45	90	93.8	97.5	86.9	93.2	80.0	54.2	86.8	115.0	82.0	64.2	1.27	1.37	1.70	1.56	1.08	1.04	1.44	1.76	0.75	0.97
4	9	Se	L	12.37	3	127.1	98.8	69.0								0.72	0.95	0.75							
4	9	Pc	L	231.99	102	80.6	104.0	74.1	66.4	88.4	102.2	101.2	98.2	88.6	125.4	1.37	1.40	1.16	0.99	1.11	1.25	1.58	1.44	0.88	1.59

Notes:

Great Bur Reed	Se
Wild Rice	Za
Common Arrowhead	Sl
Rice Cut Grass	Lo
Sessile Fruited Arrowhead	Sr
Pickerel Weed	Pc
Walter Millet	Ew
Spike Rush	Er
Small Water Plantain	Ap
Switchgrass	Pv
Cattail	Tl
Soft Stemmed Bull Rush	Sv
BugleWeed	Ar
Common Clot Bur	Xc
Reed Canary Grass	Pa
Purple Loosestrife	Ls

Appendix H

Transformation of Field Data to Subindices

BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

Appendix H – Transformation of Field Data to Subindices

Field data were collected from unconsolidated river bottom, aquatic vegetation bed, shoreline, and riverine fringing wetland habitats in the candidate Phase 1 areas of the Upper Hudson River in accordance with the Standard Operating Procedures (SOPs) provided in the *Habitat Delineation and Assessment Work Plan* (HDA Work Plan) (Blasland, Bouck & Lee, Inc. [BBL], 2003) and reprinted as Appendices A through D to this *Habitat Assessment Report For Candidate Phase 1 Areas* (Phase 1 HA Report). These data were collected using different units and scales of measurement and were therefore transformed into comparable unitless measures ranging from 0.0 to 1.0 for integration into the functional capacity index (FCI) models (Smith and Wakeley, 2001). For the purposes of developing the FCI models for the candidate Phase 1 areas, all stations were considered "reference stations" since they represent current conditions prior to disturbance by remediation, and since the goal of the habitat replacement and reconstruction program is to replace the functions of the habitats of the Upper Hudson River to within the range of functions found in similar physical settings in the Upper Hudson River, not to improve those functions (BBL, 2003). As a result, all collected data are included in the development of the subindices.

The process of transforming field data to subindices for each of the four habitats is described below. In addition, graphs depicting the transformed data are attached. For each variable, a subindex value of 1.0 has been assigned to the measured value that represents the "optimal" condition among all stations. In some cases, this "optimal" value is the highest measured value (e.g., aboveground biomass), while in others it is the lowest value measured (e.g., percent nuisance species). Subindex values vary linearly from 0 to 1.0 for values greater than or less than the optimal value in accordance with the national and regional guidance documents (Ainslie et al., 1999; Smith and Wakeley, 2001). For some variables (e.g., percent cover of aquatic vegetation), the subindex score decreases from 1.0 as the measured value increases past the "optimal" measured value (equal to a subindex of 1.0).

Total organic carbon (TOC) and percent fines data from the Sediment Sampling and Analysis Program (SSAP) were used in the subindices and FCI models for unconsolidated river bottom and aquatic vegetation beds. Such data are available for a substantial number of stations for the 0- to 2-inch interval, but infrequently for other sediment intervals. Therefore, the 0- to 2-inch interval was selected to provide sediment characteristic information for the assessment stations. This interval is considered sufficient for characterizing the top portion of the substrate in these habitats. Wild celery (the dominant submerged aquatic vegetation [SAV] species in the Upper Hudson River) and other SAV species remove suspended particulate organic matter and sediments from the water column, facilitating deposition of these particles to the substrate within SAV beds. The trapped, decomposing organic matter occurs in the top portion of the substrate where detritivorous species of invertebrates (e.g., Diptera, Coleoptera, Trichoptera, and others) consume the material. The decomposing material also provides a nutrient source for wild celery and other SAV species. In unvegetated areas, the top portion of the substrate provides the initial material that benthic macroinvertebrates and/or fish contact during recruitment and spawning, respectively. Composition of the 0- to 2-inch interval also provides a relative indication of the depositional or erosional nature of the site.

A. Unconsolidated River Bottom

SUBSTRATE, EPIFAUNAL AND POOL ($V_{subcover}$) – Input data are the classification of the epifaunal substrate/available cover and pool substrate characterization as optimal, suboptimal, marginal, or poor. These categories were converted to values to transform these categorical measurements into numerical values using the

upper end of the percentages from the Barbour et al. (1999) tables (see Appendix A) for epifaunal substrate and cover, and the lower end of the percentages for pool substrate. For example, poor epifaunal substrate (10%) was converted to 0.1; marginal epifaunal substrate (10% to 30%) was converted to 0.3, etc. The subindex values used are as follows:

- Optimal = 1;
- Suboptimal = 0.5;
- Marginal = 0.3; and
- Poor = 0.1.

The maximum station averages (0.578 for epifaunal and 1.0 for pool) have been assigned a value of 1.0 (which would also apply to any subsequently measured values greater than these), and each subindex is linear from 0 to 1 for values less than the maximum. The final substrate subindex ($V_{subcover}$) used in FCI calculations is the average of the epifaunal and pool subindex values.

TOC (V_{toc}) – Input data are the measured TOC, in milligrams per kilogram (mg/kg), from the SSAP data nearest the sampling station. When multiple SSAP data existed, the values were then averaged by station. V_{toc} is a one-sided index with no upper limit. V_{toc} has a value of 1 for TOC concentrations equal to (or above) the maximum station average (52,875 mg/kg) and is linear from 0 to 1 for values less than the maximum station average.

FINES (V_{fines}) – Input data are the percent fines from the SSAP data (from the top 2 inches of the core) nearest the sampling quadrats. V_{fines} is a one-sided index with no lower limit. V_{fines} has a value of 1 for percent fines equal to (or below) the minimum station average measured (14.7%) and is linear from 1 to 0 for values greater than the minimum station average. The subindex for percent fines was completed in this manner because finer sediments are less suitable as spawning substrates for fish (Stuber et al., 1982).

B. Aquatic Vegetation Bed

BIOMASS (V_{savbio}) – Aboveground biomass was measured for each species within each quadrat at each station. The biomass of each species within the quadrat was totaled and converted to grams per square meter (g/m^2) (by multiplying by 8). Quadrat totals were then averaged by station. V_{savbio} is a one-sided index with no upper limit. V_{savbio} has a value of 1 for biomass values equal to (or greater than) the maximum station average (196 g/m^2) and is linear from 0 to 1 for values less than the maximum station average.

K, NH4, PO4 (V_{snn}) – These three nutrients were measured in sediment collected for each vegetation strata (determined by dominant species) at those stations where push cores could be collected. Each nutrient-specific subindex has a value of 1 for station concentrations equal to (or greater than) the maximum station average measured (44.7 mg/kg for K, 14.6 mg/kg for NH4, and 48.0 mg/kg for PO4) and is linear from 0 to 1 for lower concentrations. The final subindex (V_{snn}) used in FCI calculations is the average of the three nutrient-specific subindex values.

LIGHT (V_{light}) – Input data are the average light attenuation coefficients (Kd) calculated for the aquatic bed. Kd was calculated according to the Lambert-Beer equation ($I_z = I_o e^{-kdz}$), where Iz = light measured at a water depth of 1.0 meter (m) and Io = light measured at a water depth of 0.5 m, based on light measurements taken at 0.5 m and 1.0 m below the water surface at the center and edge of the aquatic bed. When Kd values were available for the center and edge of the bed, the values were averaged to obtain a Kd value for the aquatic bed. Light was only measured at seven stations due to weather conditions (rain), which prevented taking measurements at the two remaining stations. Light data from the edge of the bed were not available for Station 1 because the aquatic bed extended bank to bank and upstream to the remnants of the Fort Edward Dam and

downstream to the Reynolds Road Bridge. Additionally, at Station 1, Kd was calculated using the ambient light at the surface and the light available at 0.5 m because the 1.0 m reading was inaccurate due to plants covering the sensor. V_{light} is a one-sided index with no upper limit. V_{light} has a value of 1 for Kd measurements equal to (or greater than) the maximum station value (1.3 m^{-1}) and is linear from 0 to 1 for values less than that.

CURRENT ($V_{current}$) – Input data are the absolute current velocity in feet per second (fps) measured at the center of the bed at a representative depth. In 2003 sampling measurements were made 10 centimeters (cm) above the substrate. In 2004 sampling measurements were made at 20 and 80% of the water depth, then averaged. The subindex is 1 for velocities equal to the maximum measured velocity (1.11 fps). $V_{current}$ is linear from 0 to 1 for current velocities less than the maximum station average, and decreases linearly from 1 to 0 for velocities greater than the maximum and less than 1.5 fps. $V_{current}$ decreases for higher velocities because flow velocities greater than 1.5 fps can damage or uproot plants (Doyle, 1999). $V_{current}$ decreases for lower velocities because stagnant conditions can create poor growing conditions for some species of aquatic vegetation.

DENSITY/NUMBER OF STEMS ($V_{savdense}$) – Input data are the number of stems by species per quadrat per station. These measurements were summed for all species within each quadrat, converted to stems/m^2 (by multiplying by 8), then averaged across quadrats to calculate an average shoot density measurement for each station. The subindex receives a value of 1 for shoot density values equal to (or greater than) the maximum station average (793 shoots/m^2). $V_{savdense}$ is linear from 0 to 1 for densities less than the maximum station average.

PERCENT COVER ($V_{savcover}$) – Input data are the percent cover of aquatic vegetation measured for each quadrat at each station. Values were averaged across quadrats to obtain station averages. The subindex value is 1 for percent cover equal to the maximum station average (78.3%). $V_{savcover}$ is linear from 0 to 1 for percent cover less than the maximum station average, and linear from 1 to 0.7 for percentages between the maximum and 100%. The subindex decreases from 1 for percent cover values greater than the maximum station average because aquatic vegetation that is too dense can impede fish access and movement (Stuber et al., 1982). However, the subindex does not fall to 0 for higher percent cover values because there is still value associated with the presence of aquatic vegetation. The subindex falls to 0.7 for higher percent covers, equal to the subindex value for 55% cover.

WATER DEPTH (V_{depth}) – Input data are the water depths measured for each quadrat at each station. To standardize water depth measurements taken on different days and under different flow conditions, water depths were adjusted by multiplying the measured depth by the ratio of the annual mean stage height to daily stage height at Fort Edward Dam. Depth measurements were averaged across quadrats to obtain an average depth per station. The subindex value is 1 for depths equal to the maximum station average depth (196 cm). V_{depth} is linear from 0 to 1 for depths less than the maximum station average, and linear from 1 to 0 for depths between the maximum and 300 cm. The subindex remains at 0 for depths above 300 cm because submerged aquatic vegetation is not common at depths greater than 300 cm in the Upper Hudson River.

C. Shoreline

DOWNFALL/WOODY DEBRIS (V_{down}) – Input data are the number, diameter, and length of fallen trees. The total area of woody debris was calculated for each sample, and then averaged by station. V_{down} is a one-sided index with no upper limit. V_{down} has a value of 1 for downfall values equal to (or above) the maximum station average measured (239 m^2). V_{down} is linear from 0 to 1 for downfall values less than the maximum station average.

BANK ASSESSMENT ($V_{bankstab}$) – Input data are the percent of the bank that is stable, moderately stable, moderately unstable, or unstable. Each category has an associated weight to enable a weighted sum to be

calculated for each sample. The following weights, derived from the percent of erosion present for each category from Barbour et al. (1999), were used:

- Stable = 0;
- Moderately stable=0.05;
- Moderately unstable = 0.3;
- Unstable = 0.6.

The weighted sum was subtracted from 1 so that higher values indicate more preferable conditions to be consistent with the other subindices. Using these values, an average value was calculated for each station. $V_{bankstab}$ is a one-sided index with no upper limit. $V_{bankstab}$ has a value of 1 for stability values equal to the maximum station average measured (100%) and is linear from 0 to 1 for values less than the 100%.

BANK VEGETATION ($V_{bankveg}$) – Input data recorded onsite is the percent of the bank that is covered by vegetation. Each category has an associated weight to enable a weighted sum to be calculated for each sample. The following weights were derived from the percent cover for each category from Barbour et al. (1999):

- Optimal = 1;
- Suboptimal = 0.9;
- Marginal = 0.7; and
- Poor = 0.5.

The weighted sum was calculated for each sample, and then averaged by station. $V_{bankveg}$ is a one-sided index with no upper limit. $V_{bankveg}$ has a value of 1 for bank vegetation values equal to (or greater than) the maximum station average measured (100%) and is linear from 0 to 1 for values less than the maximum station average.

RIPARIAN (V_{down}) – Input data are the percent cover of the riparian edge in the canopy, understory, and herbaceous layers. $V_{riparian}$ is a one-sided index with no upper limit. Each of the three cover-type subindices has a value of 1 for values equal to (or greater than) the maximum station average measured (80%, 80%, and 100%, respectively). Each subindex is linear from 0 to 1 for values less than the maximum station average value. The riparian subindex ($V_{riparian}$) value used in FCI calculations is the average of the three riparian subindex values for the canopy, understory, and herbaceous layers.

D. Wetlands

SLOPE ($V_{wetslope}$) – Input data are slope measurements along three transects in each of the four wetlands. Distance from shore and elevation was used to estimate the slope along each transect. The slopes from each transect were combined to obtain an average slope for each wetland. $V_{wetslope}$ is a one-sided index with no lower limit. $V_{wetslope}$ has a value of 1 for wetland slope averages from 0 (no slope) up to the minimum wetland average slope (0.022), and is linear from 1 to 0 for slope estimates from the minimum wetland average up to 0.25. This is based on the assumption that water elevation changes are too dynamic for the development of certain functions in wetlands with slopes greater than 0.25.

AREA/SIZE ($V_{wetarea}$) – Each wetland was measured in acres, with no replication. $V_{wetarea}$ is a one-sided index with no upper limit. $V_{wetarea}$ has a value of 1 for sizes equal to (or greater than) the maximum wetland size measured (0.27 acre) and is linear from 0 to 1 for values less than that.

CONTIGUOUS (V_{contig}) – Input data are the percent of each wetland edge that is contiguous with adjacent undisturbed habitat(s). V_{contig} has a value of 1 for contiguous values equal to (or greater than) the maximum measurement (100%) and is linear from 0 to 1 for values less than that.

WETLAND EDGE ($V_{wetedge}$) – Input data are the length of each wetland edge in feet. $V_{wetedge}$ has a value of 1 for edge lengths equal to (or greater than) the maximum measured wetland edge (437 ft) and is linear from 0 to 1 for values less than that.

E. Wetlands, By Strata

BIOMASS (V_{wetbio}) – Input data are the amount of live and dead aboveground biomass by species for each quadrat in each vegetation community strata in each wetland. Biomass was summed across all species to get total biomass by quadrat within each vegetation community strata in each wetland. V_{wetbio} has a value of 1 for quadrat biomass values equal to (or greater than) the maximum quadrat biomass measurement in the vegetation community strata and is linear from 0 to 1 for values less than that. A separate biomass subindex was calculated for each vegetation community strata present. The maximum vegetation community biomass values ranged from 244 g/m^2 for pickerelweed to 845 g/m^2 for great burreed. The final biomass subindex value used in FCI calculations is the average of the applicable vegetation community strata-specific subindices.

DENSITY/NUMBER OF STEMS ($V_{wetdense}$) – Input data are the number of live stems by species for each quadrat in each vegetation community strata of each wetland. The number of stems was averaged across species within each quadrat in each vegetation community strata of each wetland. $V_{wetdense}$ has a value of 1 for quadrat density values equal to (or greater than) the maximum quadrat density measurement and is linear from 0 to 1 for values less than that. A separate density subindex was calculated for each vegetation community strata present. The maximum vegetation community stem density ranged from 14.3 stems/m^2 for cattails to 433 stems/m^2 for rice cut grass/water millet. The final density subindex value used in FCI calculations is the average of the applicable vegetation community strata-specific subindices.

STEM LENGTH ($V_{wetlength}$) – Input data are the measured stem lengths for up to 11 replicates for each species in each quadrat in each vegetation community strata of each wetland. The replicates were averaged for each species within each quadrat of each wetland. $V_{wetlength}$ has a value of 1 for quadrat stem length values equal to (or greater than) the maximum quadrat measurement and is linear from 0 to 1 for values less than that. A separate stem length subindex was calculated for each vegetation community strata. The maximum quadrat average stem length ranged from 66.7 cm for pickerelweed/arrowhead to 149 cm for reed canary grass. The final stem length subindex value used in FCI calculations is the average of the applicable vegetation community strata-specific subindices.

STEM DIAMETER ($V_{wetthick}$) – Input data are the measured stem diameters for up to 11 replicates for each species in each quadrat in each vegetation community strata of each wetland. The replicates were averaged for each species within each quadrat of each wetland. $V_{wetthick}$ has a value of 1 for quadrat stem diameter values equal to (or greater than) the maximum quadrat measurement and is linear from 0 to 1 for values less than that. A separate stem diameter subindex was calculated for each vegetation community strata. The maximum quadrat average stem diameter ranged from 0.55 cm for reed canary grass to 2.6 cm for great burreed. The final stem diameter subindex value used in FCI calculations is the average of the applicable vegetation community strata-specific subindices.

% COMPOSITION OF DOMINANT SPECIES (V_{wetspp}) – Input data are the proportion of quadrat total biomass that is from the dominant species (determined by aboveground biomass) for each vegetation community strata. The ratio of dominant species to total quadrat biomass was calculated for each quadrat in each vegetation community strata of each wetland. Each strata subindex has a value of 1 for percentages equal to the minimum

quadrat average percentage, and is linear from 0 to 1 for values below that minimum and from 1 to 0.25 for values above that minimum. The subindex does not fall to 0 when the wetlands are dominated by one species because, although it is not as preferable as a diverse vegetation community, there is still value associated with the presence of vegetation. Minimum percent compositions ranged from 48% for rice cut grass/water millet to 99% for pickerelweed/arrowhead. The final percent composition subindex value used in FCI calculations is the average of the applicable vegetation community strata-specific subindices.

% NUISANCE SPECIES ($V_{wetnuisance}$) – Input data are the proportion of quadrat total biomass that is from nuisance species (determined by aboveground biomass) for each vegetation community strata. Nuisance species were purple loosestrife and reed canary grass. The ratio of nuisance species to total quadrat biomass was calculated for each quadrat in each vegetation community strata of each wetland. Each strata subindex has a value of 1 for percentages equal to the minimum quadrat average percentage and is linear from 1 down to 0 for percentages greater than the minimum**.** Percent nuisance species was 0% (subindex = 1) for all vegetation communities except reed canary grass, which was 100% (subindex = 0) nuisance species. The final percent composition subindex value used in FCI calculations is the average of the applicable vegetation community strata-specific subindices.

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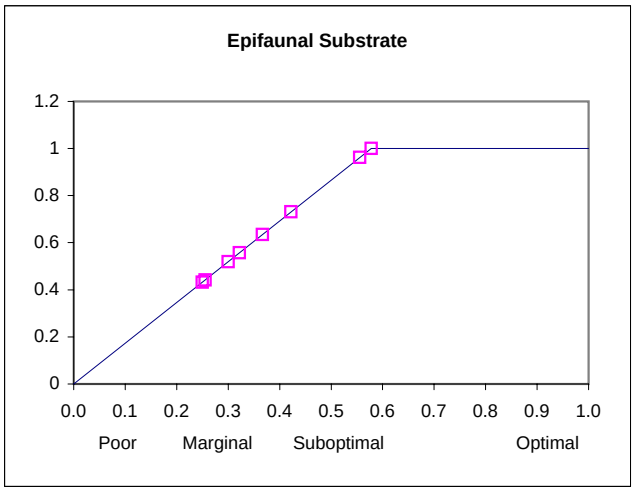
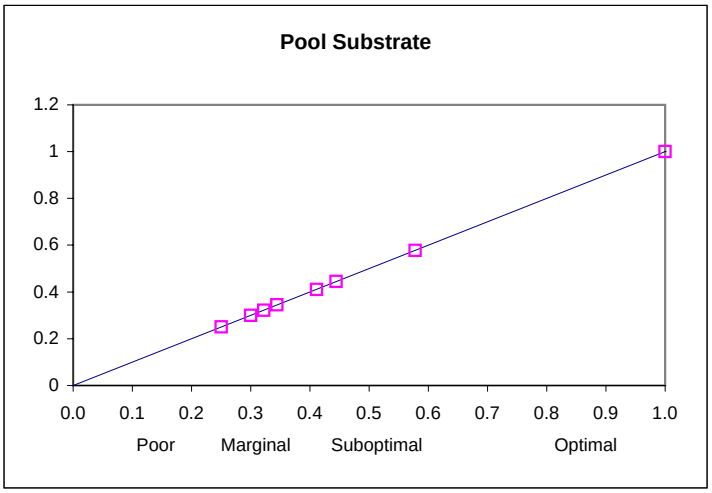
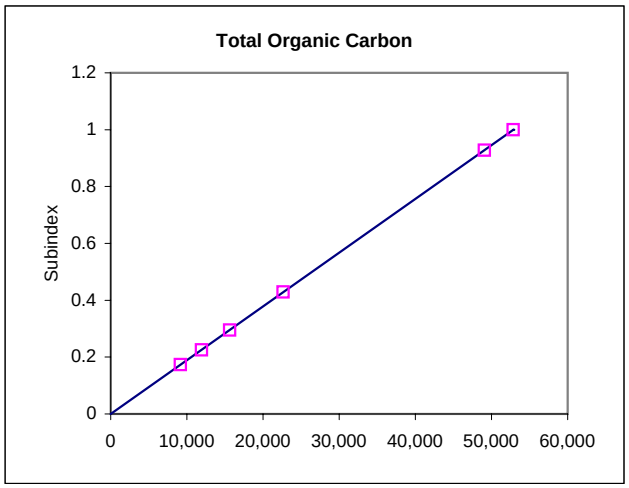
Appendix H - Transformation of Field Data to Subindices (Unconsolidated Bottom)

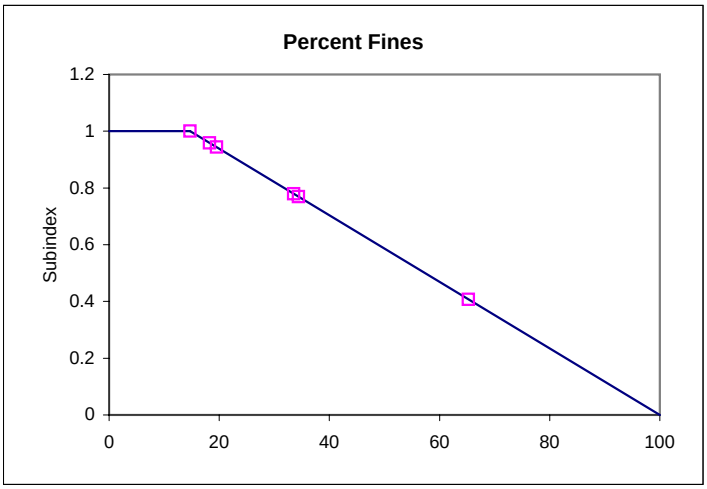
Station	Epifaunal Substrate	Pool Substrate	TOC
Min	0.25	0.25	9144.44444
Max	0.577777778	1	52875
Mean	0.38125	0.45625	26884.0278
StDev	0.127620245	0.242023318	19236.6616
Max+SD	0.705398022	1.242023318	72111.6616
Subindex			
0	0	0	0
1	0.577777778	1	52875
1	1	1	52875
1	inf	inf	inf
Initial Slope	1.730769231	1	1.8913E-05
Final Slope			

	Fines
	14.7
	65.26667
	30.93968
	18.7187
	83.98537
1	0
1	14.7
1	14.7
0	100
	-0.011723









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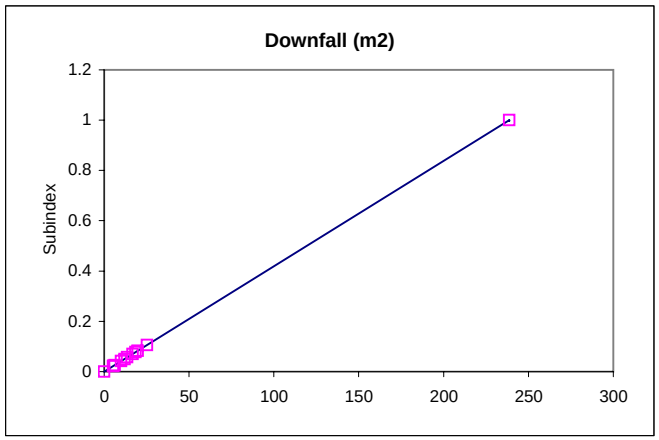
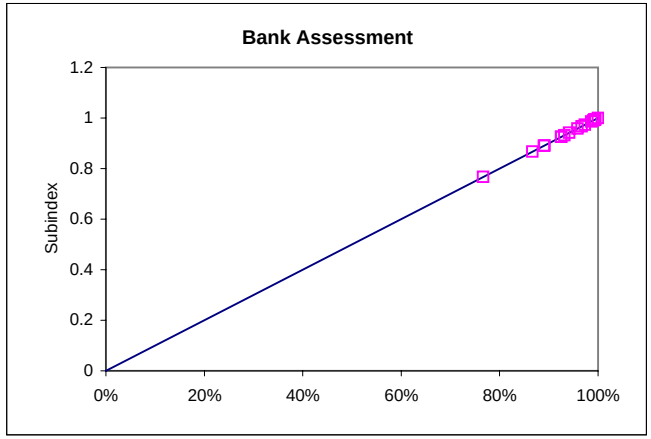
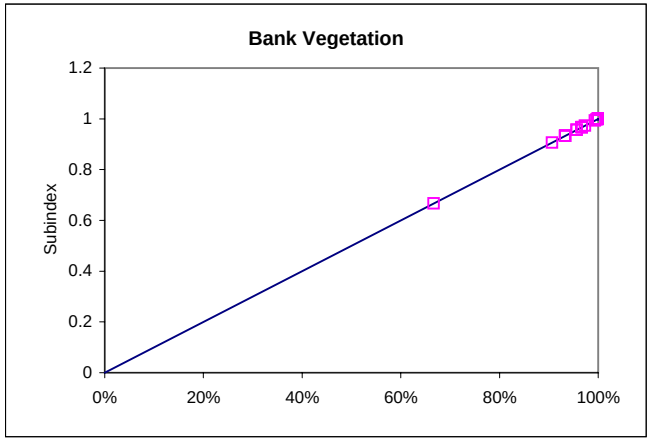
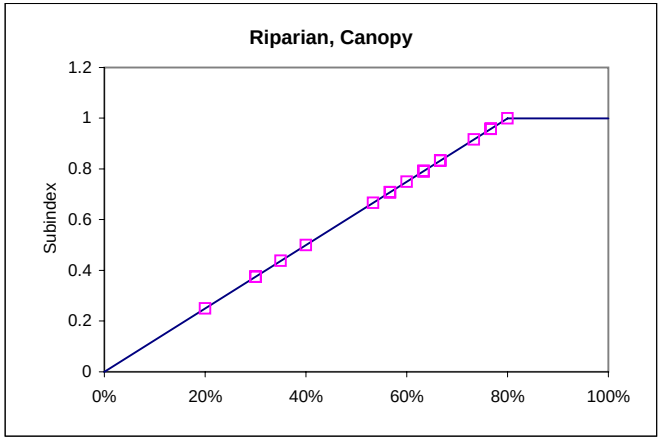
Appendix H - Transformation of Field Data to Subindices (Shoreline)

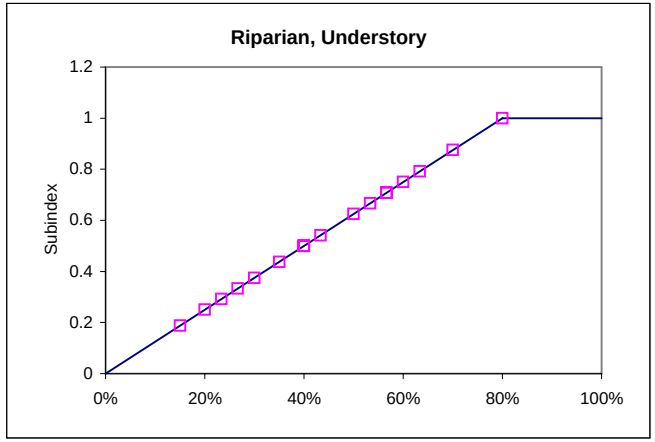
Station	Downfall (m2)	Bank Assessment	Bank Vegetation	Riparian, Canopy	Riparian, Understory	Riparian, Herbaceous
Min	0	0.766666667	0.666666667	0.2	0.15	0.3
Max	238.7142585	1	1	0.8	0.8	1
Mean	28.01124989	0.943796296	0.958333333	0.562037037	0.446296296	0.677777778
StDev	61.01028477	0.060641466	0.078292647	0.179669773	0.180010489	0.174145908
Max+SD	299.7245433	1.060641466	1.078292647	0.979669773	0.980010489	1.174145908
SubIndex						
0	0	0	0	0	0	0
1	238.7142585	1	1	0.8	0.8	1
1	238.7142585	1	1	1	1	1
Initial Slope	0.0042	1.0000	1.0000	1.2500	1.2500	1.0000
Final Slope						

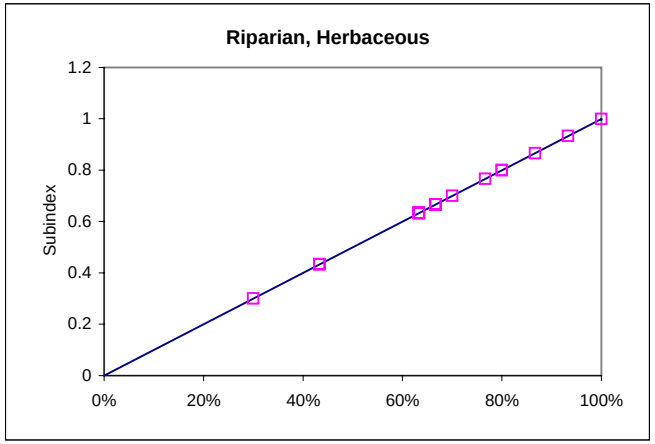












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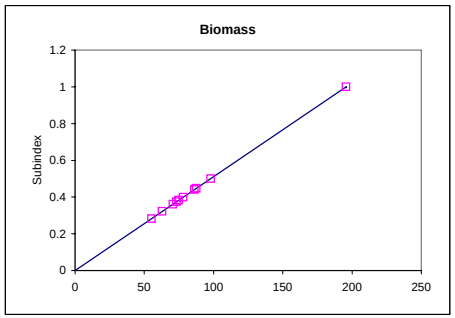
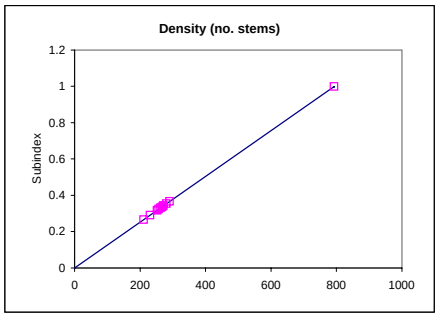
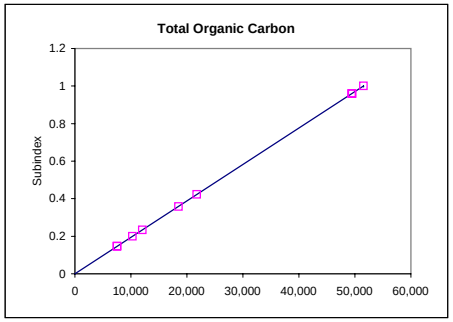
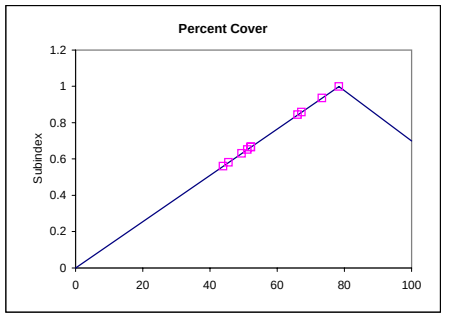
Appendix H - Transformation of Field Data to Subindices (SAV)

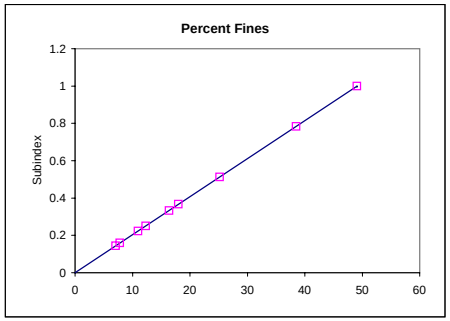
Summary of Station Average Values											
		(density)								(Kd)	(current)
Station	Biomass(g/m3	No.Stems(/m3	TOC	Adj.Depth	%Cover	%Fines	K	NH4	PO4	light	Velocity
Min	55.21	211.56	7533	86.89	43.89	7.1	0.94	6.27	0.82	0.751	0
Max	195.65	792.89	51567	195.78	78.33	49.1	44.68	14.57	47.98	1.323	1.11
Mean	88.20	311.78	25358	135.04	57.94	20.6	28.76	10.37	31.02	1.065	0.196
StDev	39.71	170.64	19204	33.19	12.21	14.5	11.25	2.47	13.04	0.234	0.261
Max+SD	235.36	963.53	70770	228.97	90.54	64	55.92	17.04	61.02	1.557	1.371
SubIndex											
0	0	0	0	0	0	0	0	0	0	0	0
1	195.653333	792.8888889	51566.66667	195.7778	78.33333	49.1	44.675	14.57	47.975	1.323236	1.11
1	195.653333	792.8888889	51566.66667	195.7778	78.33333	49.1	44.675	14.57	47.975	1.323236	1.11
0	inf	inf	inf	300		inf	inf	inf	inf	inf	1.5
0.7					100						
Initial Slope	0.00511108	0.001261211	1.93924E-05	0.005108	0.012766	0.020367	0.022384	0.068634	0.020844	0.755723	0.900901
Final Slope				-0.00959	-0.01385						-2.5641

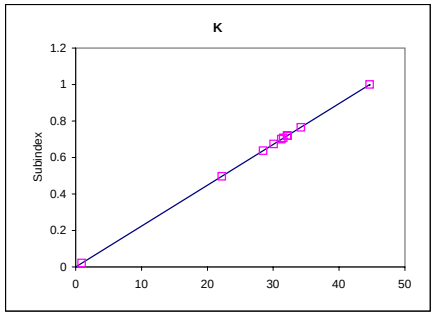


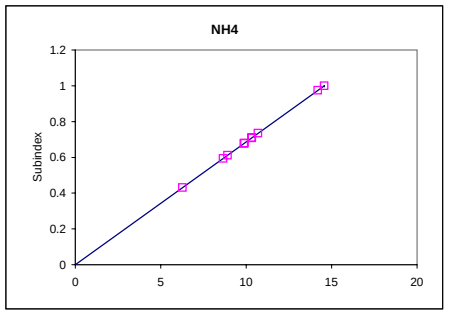


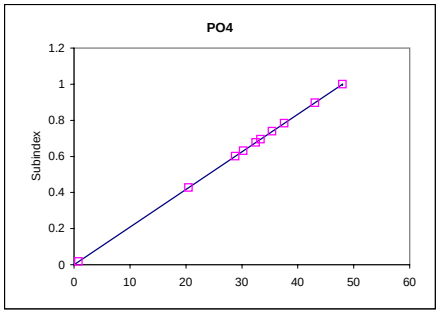


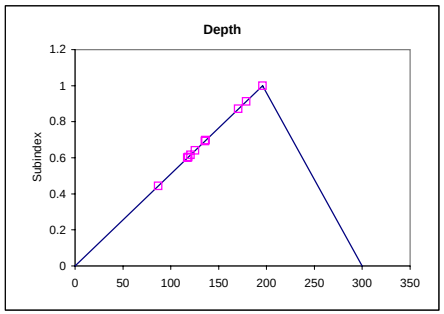


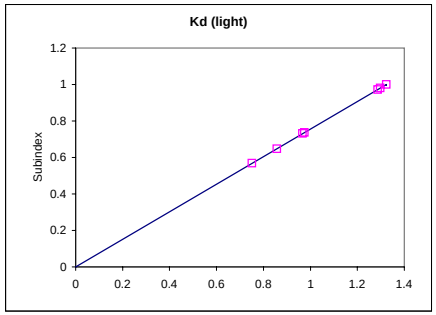


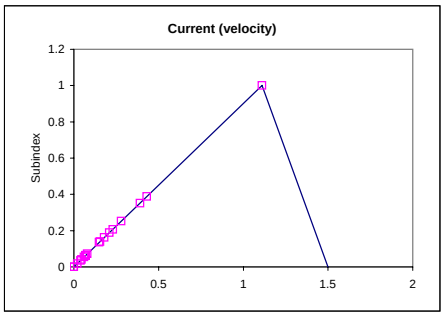












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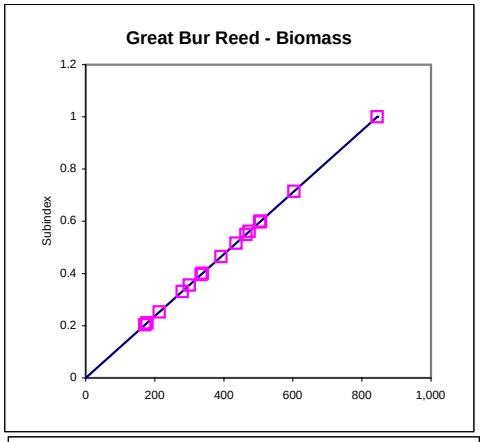
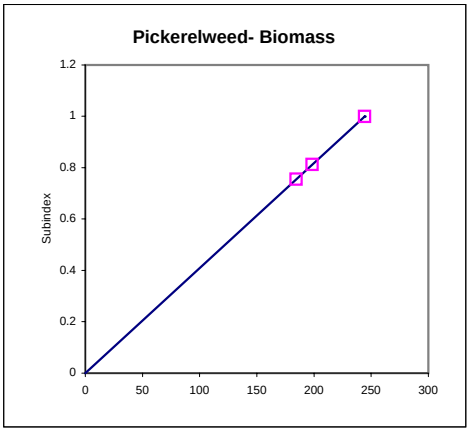
Appendix H - Transformation of Field Data to Subindices (Wetland)

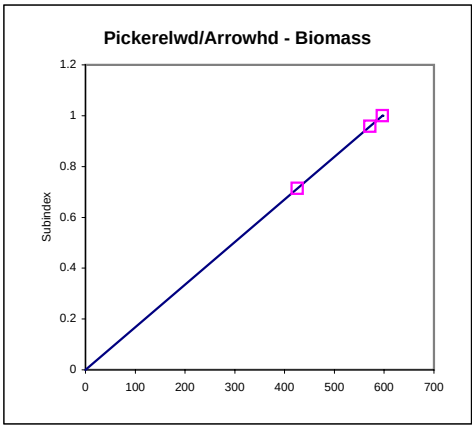
	Biomass Great Bur Reed	Biomass Pickerelweed	Biomass Pickerelweed/Arrowhe	Biomass Reed Canary Grass	Biomass Rice Cut Grass/Water	Biomass Cattail
Min	171.33	184.56	425.61	435.79	28.43	328.56
Max	844.55	244.36	596.62	783.38	348.23	764.86
Mean	402.590	209.127	531.240	580.070	157.730	573.830
StDev	177.525	31.294	92.337	181.158	106.947	223.150
Max+SD	1022.075	275.654	688.957	964.538	455.177	988.010

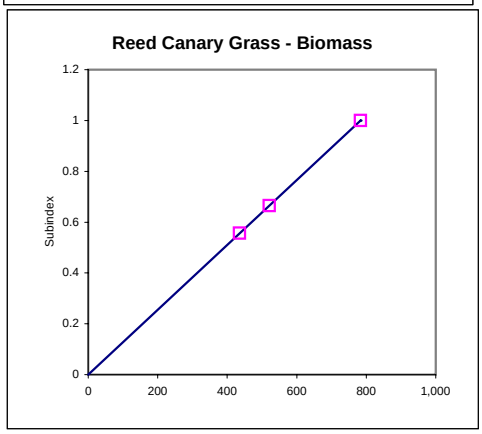
SubIndex	Great Bur Reed	Pickerelweed	Pickerelweed/Arrowhe	Reed Canary Grass	Rice Cut Grass/Water	Cattail
0	0	0	0	0	0	0
1	844.55	244.36	596.62	783.38	348.23	764.86
1	844.55	244.36	596.62	783.38	348.23	764.86
0	inf	inf	inf	inf	inf	inf

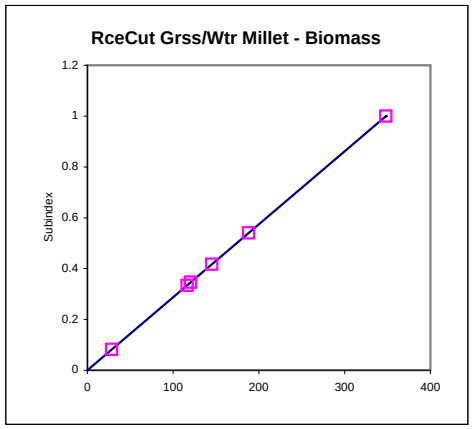
	Great Bur Reed	Pickerelweed	Pickerelweed/Arrowhe	Reed Canary Grass	Rice Cut Grass/Water	Cattail
initial slope	0.001184063	0.004092323	0.001676109	0.00127652	0.002871665	0.001307429
final slope						

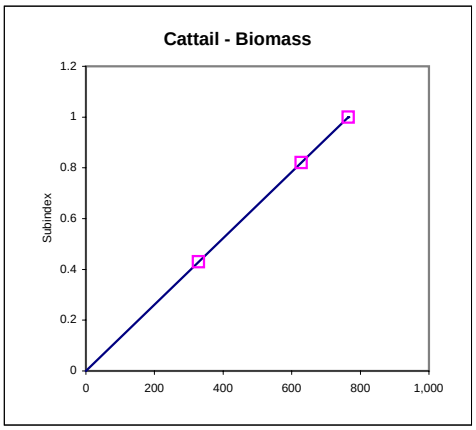












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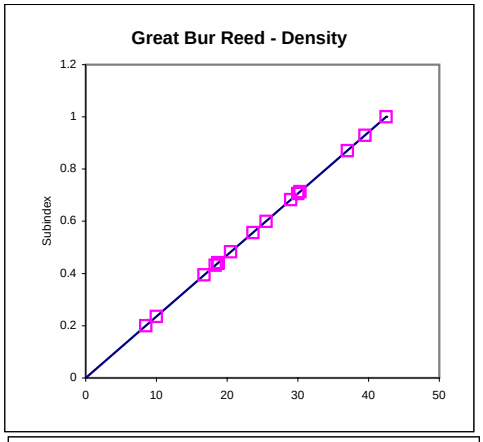
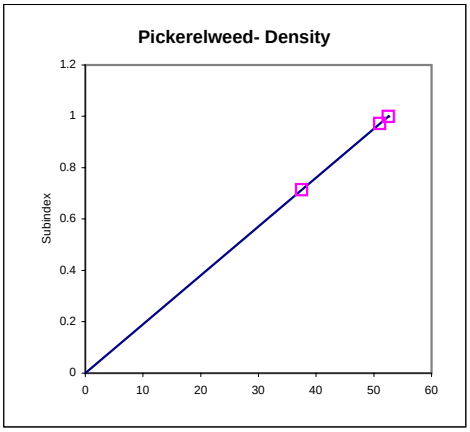
Appendix H - Transformation of Field Data to Subindices (Wetland)

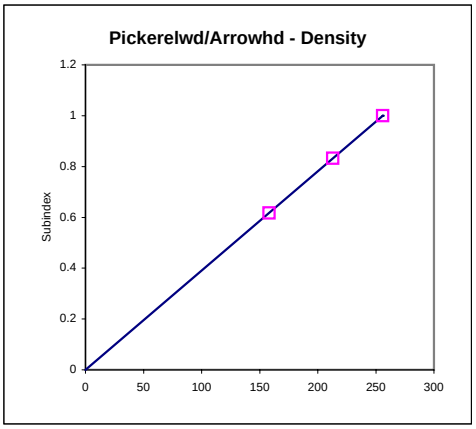
	Density/NoStems Great Bur Reed	Density/NoStems Pickerelweed	Density/NoStems Pickerelweed/Arrowhe	Density/NoStems Reed Canary Grass	Density/NoStems Rice Cut Grass/Water	Density/NoStems Cattail
Min	8.5	37.5	158	57	148.1428571	10
Max	42.5	52.5	256	135	432.6666667	14.33333333
Mean	24.600	47.000	209.000	105.333	298.557	12.178
StDev	10.137	8.261	49.122	42.218	109.037	2.167
Max+SD	52.637	60.761	305.122	177.218	541.704	16.500

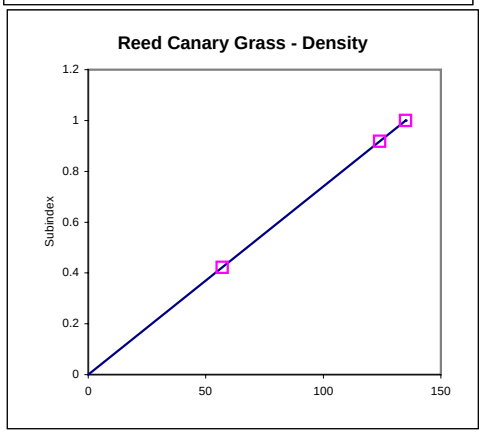
SubIndex	Great Bur Reed	Pickerelweed	Pickerelweed/Arrowhe	Reed Canary Grass	Rice Cut Grass/Water	Cattail
0	0	0	0	0	0	0
1	42.5	52.5	256	135	432.6666667	14.33333333
1	42.5	52.5	256	135	432.6666667	14.33333333
0	inf	inf	inf	inf	inf	inf

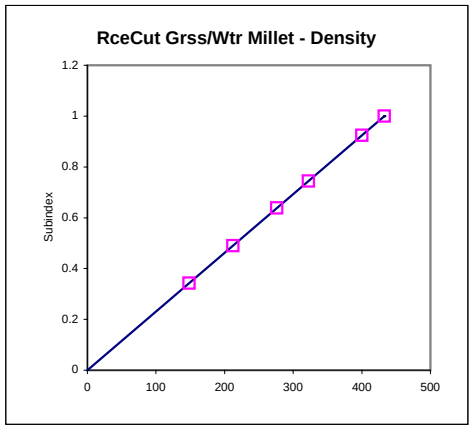
	Great Bur Reed	Pickerelweed	Pickerelweed/Arrowhe	Reed Canary Grass	Rice Cut Grass/Water	Cattail
initial slope	0.023529412	0.019047619	0.00390625	0.007407407	0.002311248	0.069767442
final slope						

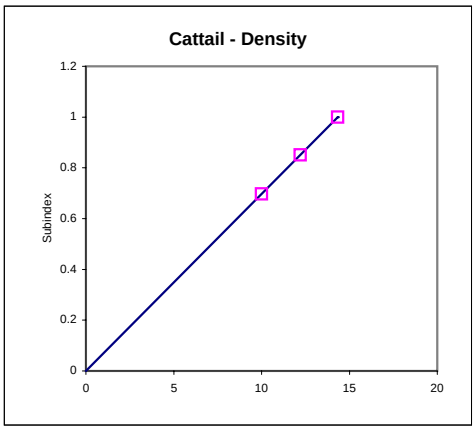












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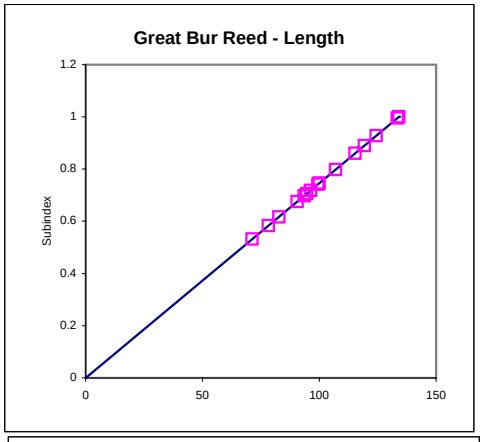
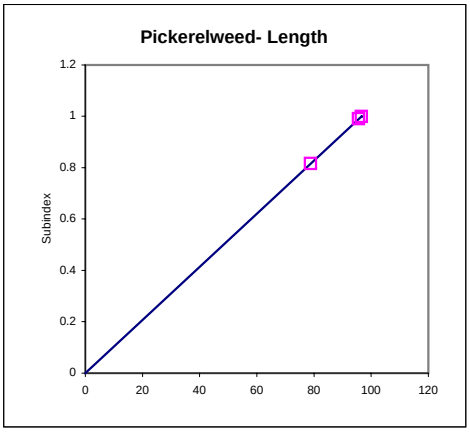
Appendix H - Transformation of Field Data to Subindices (Wetland)

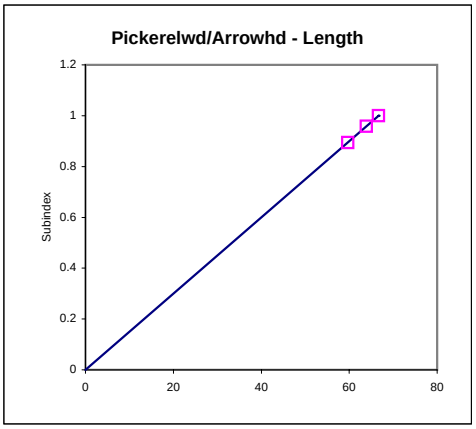
	Stem Length Great Bur Reed	Stem Length Pickerelweed	Stem Length Pickerelweed/Arrowhe	Stem Length Reed Canary Grass	Stem Length Rice Cut Grass/Water	Stem Length Cattail
Min	71.292	78.765	59.66333333	123.0825	9.9135	88.07
Max	134.05	96.551	66.695	148.72	74.485	133.225
Mean	102.668	90.307	63.418	131.651	45.713	111.107
StDev	19.262	10.007	3.540	14.782	24.867	22.592
Max+SD	153.312	106.558	70.235	163.502	99.352	155.817

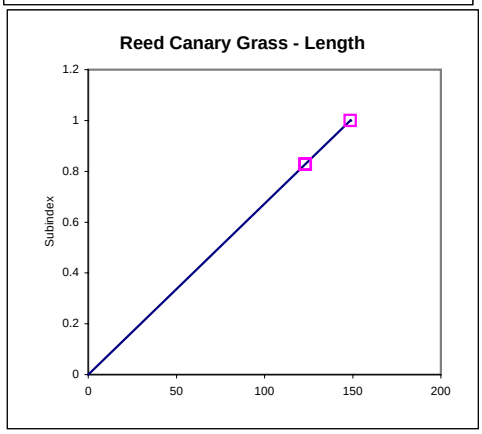
SubIndex	Great Bur Reed	Pickerelweed	Pickerelweed/Arrowhe	Reed Canary Grass	Rice Cut Grass/Water	Cattail
0	0	0	0	0	0	0
1	134.05	96.551	66.695	148.72	74.485	133.225
1	134.05	96.551	66.695	148.72	74.485	133.225
0	inf	inf	inf	inf	inf	inf

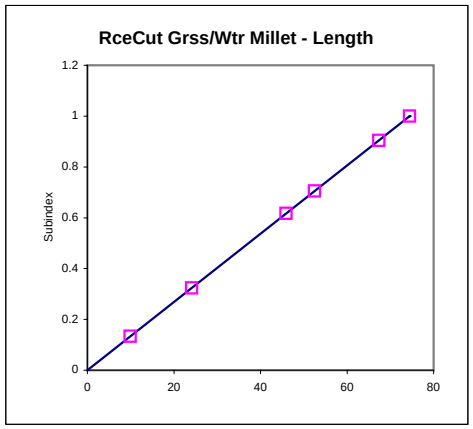
	Great Bur Reed	Pickerelweed	Pickerelweed/Arrowhe	Reed Canary Grass	Rice Cut Grass/Water	Cattail
initial slope	0.007459903	0.010357221	0.014993628	0.006724045	0.013425522	0.007506099
final slope						

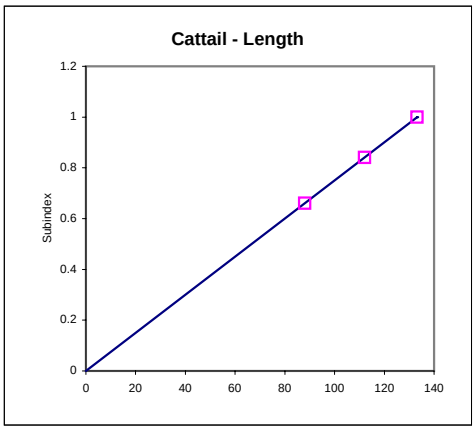












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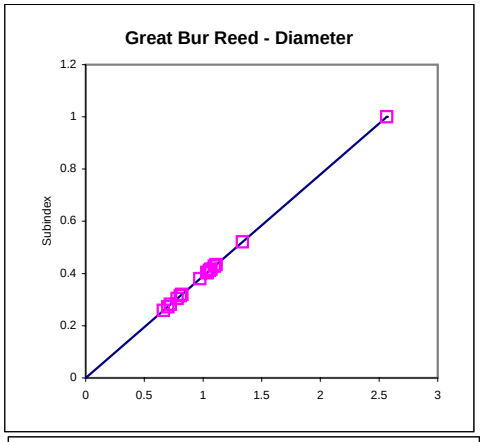
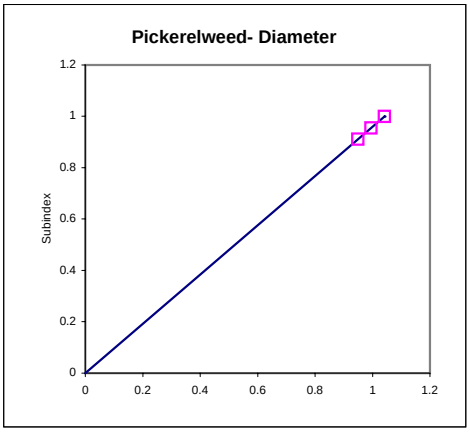
Appendix H - Transformation of Field Data to Subindices (Wetland)

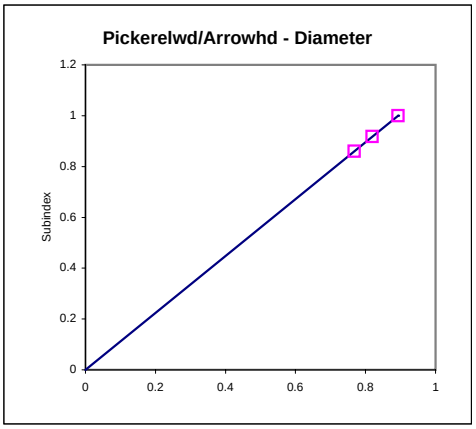
	Stem Diameter	Stem Diameter	Stem Diameter	Stem Diameter	Stem Diameter	Stem Diameter
	Great Bur Reed	Pickerelweed	Pickerelweed/Arrowhe	Reed Canary Grass	Rice Cut Grass/Water	Cattail
Min	0.662966667	0.9495	0.768	0.486	0.1885	1.1982
Max	2.566	1.041833333	0.893	0.55425	1.795	1.64
Mean	1.052	0.995	0.827	0.525	0.791	1.406
StDev	0.460	0.046	0.063	0.035	0.666	0.222
Max+SD	3.026	1.088	0.956	0.589	2.461	1.862

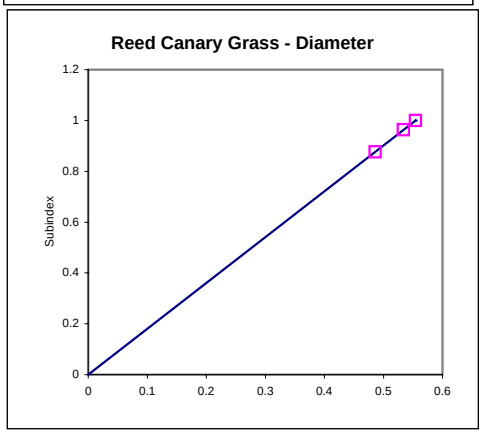
SubIndex	Great Bur Reed	Pickerelweed	Pickerelweed/Arrowhe	Reed Canary Grass	Rice Cut Grass/Water	Cattail
0	0	0	0	0	0	0
1	2.566	1.041833333	0.893	0.55425	1.795	1.64
1	2.566	1.041833333	0.893	0.55425	1.795	1.64
0	inf	inf	inf	inf	inf	inf

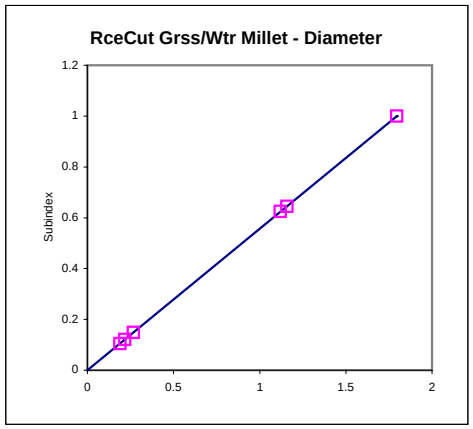
	Great Bur Reed	Pickerelweed	Pickerelweed/Arrowhe	Reed Canary Grass	Rice Cut Grass/Water	Cattail
initial slope	0.389711613	0.959846425	1.119820829	1.804239964	0.557103064	0.609756098
final slope						

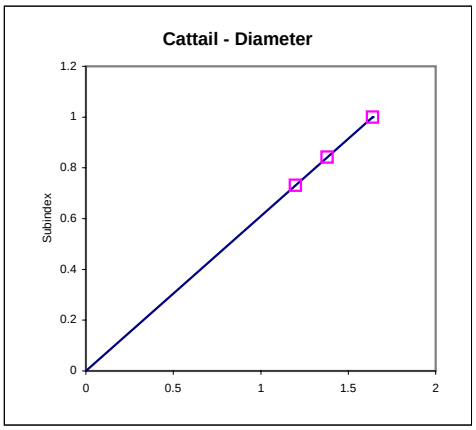












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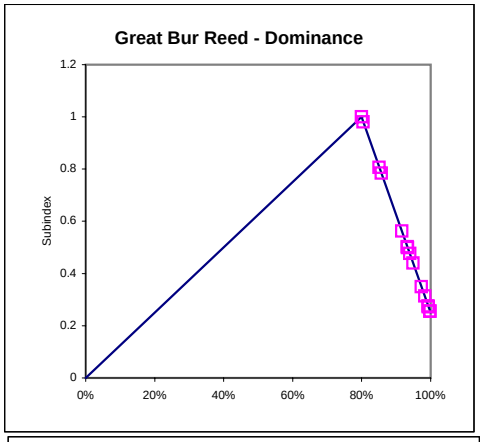
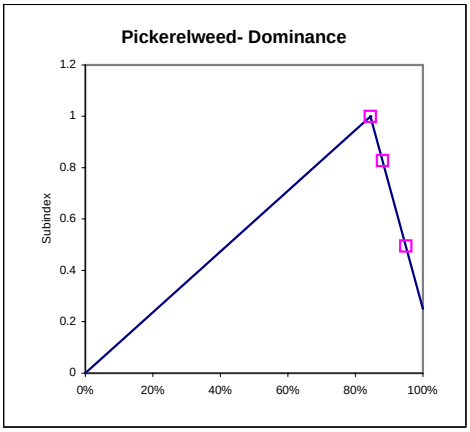
Appendix H - Transformation of Field Data to Subindices (Wetland)

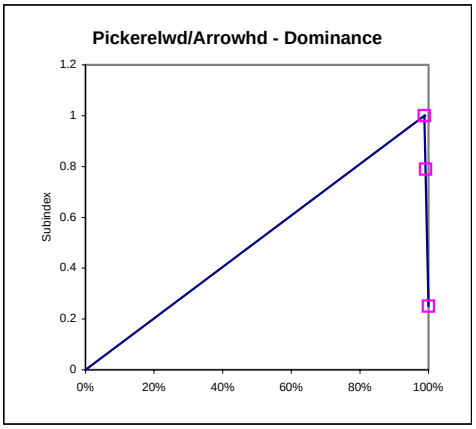
	%Comp.DomSp Great Bur Reed	%Comp.DomSp Pickerelweed	%Comp.DomSp Pickerelweed/Arrowhe	%Comp.DomSp Reed Canary Grass	%Comp.DomSp Rice Cut Grass/Water	%Comp.DomSp Cattail
Min	0.799380107	0.844553059	0.988216956	0.899905918	0.475905733	0.739201044
Max	0.998521427	0.949377967	1	1	0.997852418	0.995319405
Mean	0.928	0.891	0.993	0.967	0.889	0.907
StDev	0.069	0.053	0.006	0.058	0.203	0.145
Max+SD	1.068	1.003	1.006	1.058	1.201	1.140

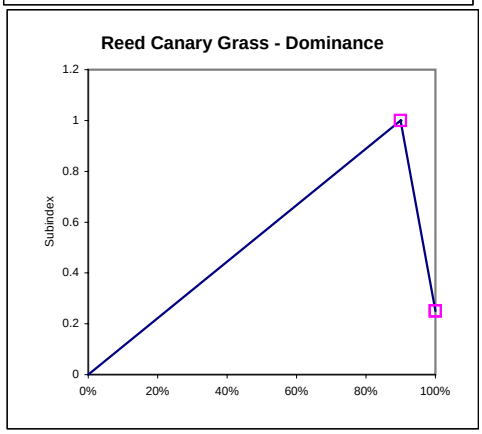
SubIndex	Great Bur Reed	Pickerelweed	Pickerelweed/Arrowhe	Reed Canary Grass	Rice Cut Grass/Water	Cattail
0	0	0	0	0	0	0
1	0.799380107	0.844553059	0.988216956	0.899905918	0.475905733	0.739201044
1	0.799380107	0.844553059	0.988216956	0.899905918	0.475905733	0.739201044
0.25	1	1	1	1	1	1

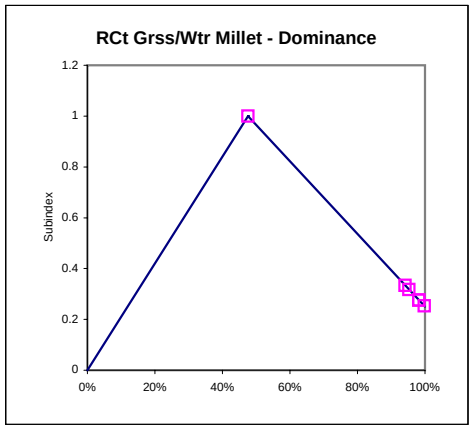
	Great Bur Reed	Pickerelweed	Pickerelweed/Arrowhe	Reed Canary Grass	Rice Cut Grass/Water	Cattail
initial slope	1.250969334	0.946512595	0.854623121	1.098133633	1.89093313	0.643810959
final slope	-3.738412921	-4.824797407	-63.65078236	-7.492950481	-1.431040268	-2.875778388

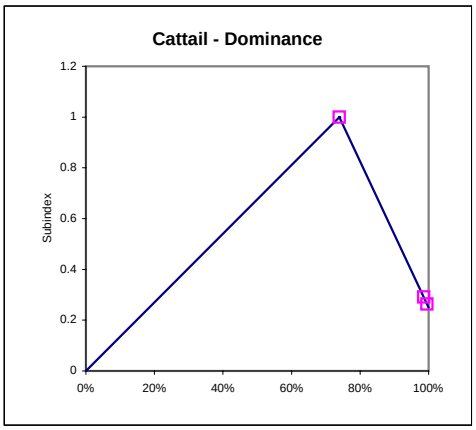












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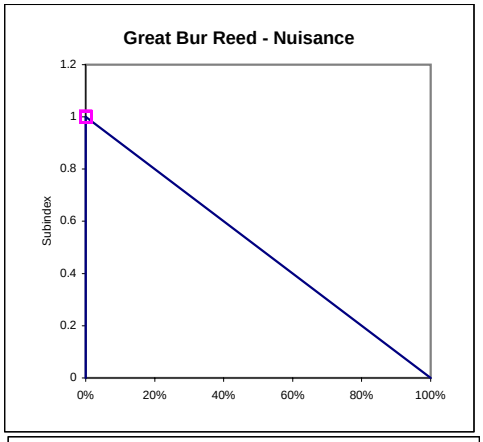
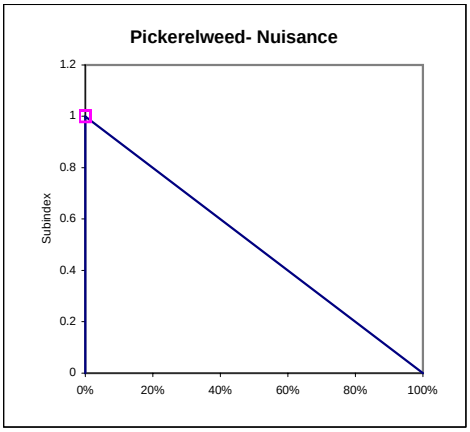
Appendix H - Transformation of Field Data to Subindices (Wetland)

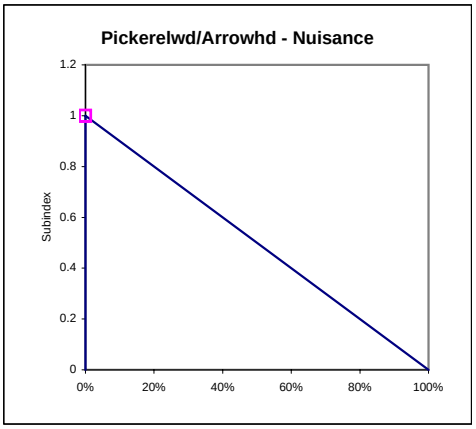
	%Nuisance Great Bur Reed	%Nuisance Pickerelweed	%Nuisance Pickerelweed/Arrowhe	%Nuisance Reed Canary Grass	%Nuisance Rice Cut Grass/Water	%Nuisance Cattail
Min	0	0	0	1	0	0
Max	0	0	0	1	0	0
Mean	0	0	0	1	0	0
StDev	0	0	0	0	0	0
Max+SD	0.000	0.000	0.000	1.000	0.000	0.000

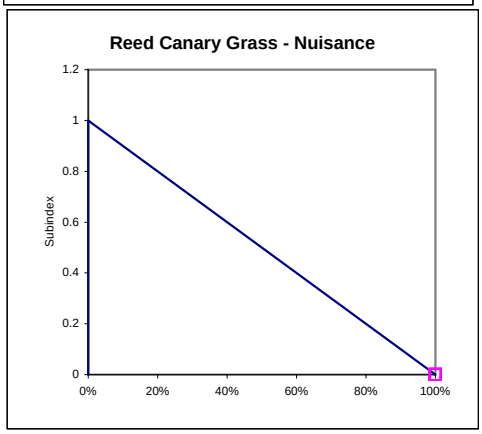
SubIndex	Great Bur Reed	Pickerelweed	Pickerelweed/Arrowhe	Reed Canary Grass	Rice Cut Grass/Water	Cattail
0	0	0	0	0	0	0
1	0	0	0	0	0	0
1	0	0	0	0	0	0
0	1	1	1	1	1	1

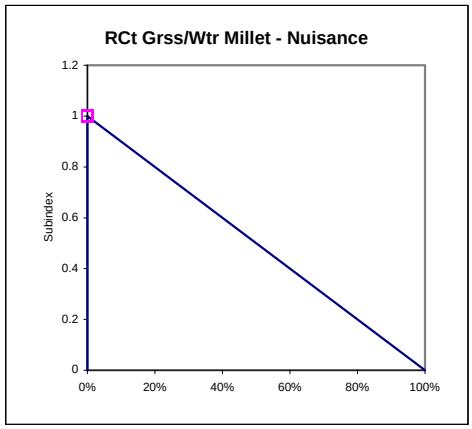
	Great Bur Reed	Pickerelweed	Pickerelweed/Arrowhe	Reed Canary Grass	Rice Cut Grass/Water	Cattail
initial slope						
final slope	-1	-1	-1	-1	-1	-1

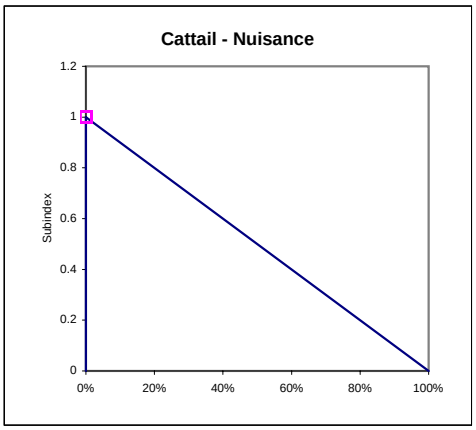












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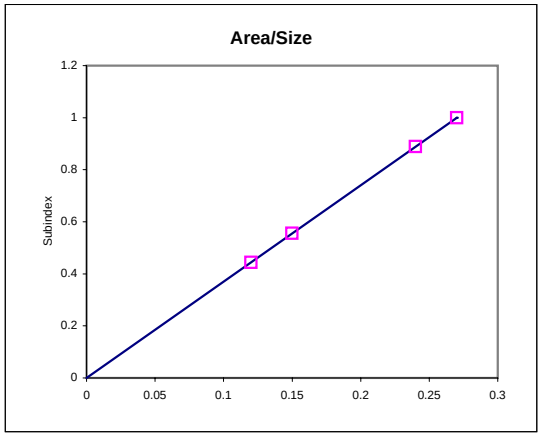
Appendix H - Transformation of Field Data to Subindices (Wetland)

Area/Size

Min	0.12
Max	0.27
Mean	0.195
StDev	0.071
Max+SD	0.341

SubIndex	
0	0
1	0.27
1	0.27
0	inf

initial slope	3.703703704
final slope	

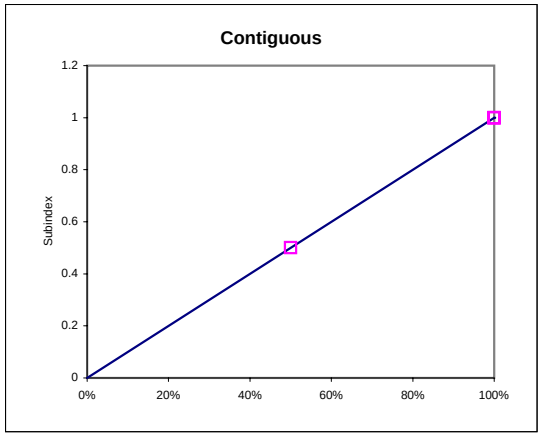


Contiguous

Min	50%
Max	100%
Mean	87.5%
StDev	25.0%
Max+SD	1.250

SubIndex	
0	0
1	100%
1	1
0	inf

initial slope	1
final slope	



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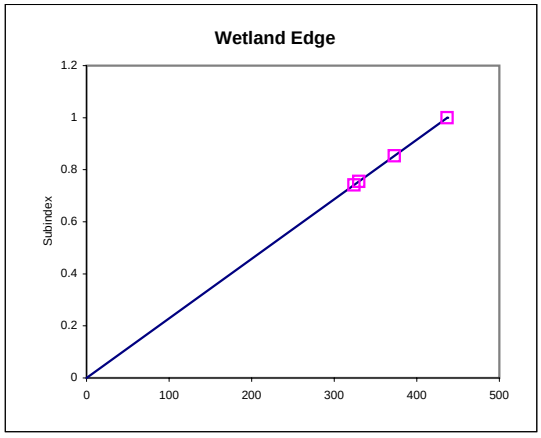
Appendix H - Transformation of Field Data to Subindices (Wetland)

Wetland Edge	
Min	324
Max	437
Mean	366
StDev	52.12165257
Max+SD	489.1216526

SubIndex	
0	0
1	437
1	437
0	inf

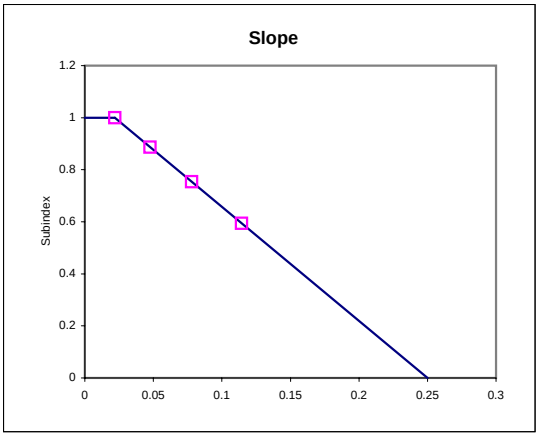
initial slope	0.00228833
final slope	



Slope	
Min	0.0218973
Max	0.11442905
Mean	0.06551795
StDev	0.039869265
Max+SD	0.154

SubIndex	
1	0
1	0.0218973
1	0.0218973
0	0.25

initial slope	
final slope	-4.383990203



Appendix I

Habitat Suitability Index Models for Key Species

BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

General Electric Company
Hudson River PCBs Superfund Site
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Appendix I - Habitat Suitability Index Models for Key Species

Parameters	Variables	Comments
Belted Kingfisher		
% of shoreline subject to severe wave action	V_1	Not applicable to the Upper Hudson
Average Water Transparency	V_2	
% Water Obstruction	V_3	
% Water Area $\leq$ 60 cm in Depth	V_4	
% Riffles	V_5	Not applicable to the Upper Hudson
Average Number of Lentic Shoreline Containing one or more Perches	V_6	
Distance to nearest suitable soil bank from 1-km sections of lentic shoreline or stream	V_7	
SIW = Water Suitability Index	$(V_2 x V_4 x V_5)^{(1/3)} x V_3$	
SIC = Cover Suitability Index	(V_6)	
SIR = Reproductive Suitability Index	(V_7)	
HSI =	Lowest life requisite suitability index for either water (SIW), cover (SIC), or reproductive cover (SIR).	
Yellow Perch		
% of Littoral area	V_1	Used in Lacustrine HSI model
% Pool and Backwater Areas	V_2	
% Cover in Pool and Backwater Areas	V_3	
Temperature (^oC)	V_4	
Temperature - Embryo (^oC)	V_5	
Dissolved Oxygen	V_6	
Degree Days - (4 to 10 ^oC)	V_7	
pH	V_8	
HSI =	Minimum Value of SI's V_2, V3, V4, V5, V6, V7, or V8	

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Appendix I - Habitat Suitability Index Models for Key Species

Parameters	Variables	Comments
Largemouth Bass		
% Pool, Backwater Area	V_1	
% area $\leq$ 6m deep	V_2	Used in Lacustrine HSI model
% Bottom Cover - Adult, Juvenile	V_3	
% Bottom Cover - Fry	V_4	
Total dissolved solids	V_5	Used in Lacustrine HSI model
Dissolved O_2 (mg/l)	V_6	
pH Range	V_7	
Average Temperature - Adult, Juvenile (^oC)	V_8	
Average Temperature - Embryo (^oC)	V_9	
Average Temperature - Fry (^oC)	V_{10}	
Maximum Turbidity - JTU	V_{11}	
Maximum Salinity - Adult, Juvenile (ppt)	V_{12}	
Maximum Salinity - Fry (ppt)	V_{13}	
Maximum Salinity - Embryo (ppt)	V_{14}	
Substrate Type - Embryo	V_{15}	
Water Level Fluctuation - Adult, Juvenile	V_{16}	
Water Level Fluctuation - Embryo (m)	V_{17}	
Water Level Fluctuation - Fry (m)	V_{18}	
Average current velocity at 0.6 depth during summer - Adult, Juvenile	V_{19}	
Current Velocity - Embryo (cm/sec)	V_{20}	
Average current velocity at 0.6 depth during summer - Fry	V_{21}	
Stream Gradient (m/km)	V_{22}	
C_F = Food	$(V_1*((V_3+V_4)/2))^(1/2)$	
C_C = Cover	$(V_1*((V_3+V_4)/2)*((V_{16}+V_{18}/2))^(1/3)$	
C_{WQ} = Water Quality	$(2*V_6+V_7+2*V_8+V_{10}+V_{11})/7$	
C_R = Reproduction	$(V_1*V_9*V_{15}*V_{17}*V_{20})^(1/5)$	
C_{OT}= Other	(V_{22}) or $(V_{19}+V_{21})/2$	
HSI =	$(C_F*C_C*C_{WQ}*C_R*C_{OT})^(1/5)$	If the C_{WQ} or C_R is less than 0.4, then the HSI is the lowest of those measures or the equation provided.

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Appendix I - Habitat Suitability Index Models for Key Species

Parameters	Variables	Comments
Smallmouth Bass		
Subsstrate Type	V_1	
% Pools	V_2	
Average Depth of lake or reservoir during summer (m)	V_3	Used in Lacustrine HSI model
Average Depth (m)	V_4	
% Cover	V_5	
pH	V_6	
Average TDS levels during the gorwing season (May to October)	V_7	Used in Lacustrine HSI model
Dissolved Oxygen (ppm)	V_8	
Turbidity (JTU)	V_9	
Temperature - Adult (^oC)	V_{10}	
Temperature - Embryo (^oC)	V_{11}	
Temperature - Fry (^oC)	V_{12}	
Temperature - Juvenile (^oC)	V_{13}	
Water Level Fluctuations (m)	V_{14}	
Gradient (m/km)	V_{15}	
C_F = Food	$(V_1*V_2*V_5)^{(1/3)}$	
C_C = Cover	$(V_1+V_2+V_4+V_5)/4$	
C_{WQ} = Water Quality	$((V_6+V_8+V_9+(2*(V_{10}*V_{12}*V_{13})^{(1/3)})))/5$	
C_R = Reproduction	$(V_{11}^{(2)}*V_{14}*V_1*V_5*V_8*V_9)^{(1/7)}$	
C_{OT}= Other	(V_{15})	
HSI =	$(C_F*C_C*C_{WQ}*C_R*C_{OT})^{(1/5)}$	If the C_{WQ} or C_R is less than 0.6, then the HSI is the lowest of those measures or the equation provided.
Common Shiner		
Temperature - Summer (^oC)	V_1	
pH	V_2	
Turbidity (JTU)	V_3	
Predominant Substrate Type	V_4	
% Pools	V_5	
Velocity - Pools (cm/s)	V_6	
Pool Class	V_7	
Temperature - Spawning (^oC)	V_8	
Velocity - Riffles (cm/sec)	V_9	
% lake area vegetated	V_{10}	Used in Lacustrine HSI model
C_{F-C} = Food-Cover	$(V_4+V_5+V_6+V_7)/4$	
C_{WQ} = Water Quality	$(V_1*V_2*V_3)^{(1/3)}$	
C_R = Reproduction	$(V_8^{2}*V_4*V_9)^{(1/4)}$	
HSI =	$(C_{F-C}*C_{WQ}*C_R)^{(1/3)}$	If the value for any component is $\leq$ 0.4, the HSI = the minimum component value. Otherwise HSI = equation provided.

Appendix I - Habitat Suitability Index Models for Key Species

Parameters	Variables	Comments
Muskrat		
% canopy cover of emergent herbaceous vegetation	V_1	Used in Herbaceous wetland and Estuarine HSI models
% of year with surface water present	V_2	
% Stream gradient	V_3	
% of riverine with surface water present during typical minimum flow	V_4	
% riverine channel domminated by emergent herbaceous vegetation	V_5	
% herbaceous canopy cover within 10 m of water's edge	V_6	
% of emergent herbaceous vegetation consisting of persistent life form species	V_7	Used in Estuarine HSI model
% of emergent herbaceous vegetation consisting of Olney bulrush, common three-square bulrush, or cattail	V_8	Used in Herbaceous wetland and Estuarine HSI models
% of open water supporting submerged or floating aquatic vegetation	V_9	Used in Estuarine HSI model
C_C = Cover	$(V_2*V_3*V_4)^(1/3)+V_5/2$	
C_F = Food	$V_6+2(V_5)*/2$	
HSI =	Lowest life requisite value for either cover or food	
Great Blue Heron		
Distance between potential nest sites and foraging area	V_1	
Presence of a water body with suitable prey population and foraging substrate	V_2	
A disturbance free zone up to 100 m around potential foraging area	V_3	
Presence of treeland cover types within 250 m of a wetland	V_4	V_4-V_6 are habitat variables for forested wetlands, not
Presence of 250 m (land) or 150 m (water) disturbance free zone around potential nest sites	V_5	riverine but are required for the HSI
Proximity of potential nest site to an active nest site	V_6	
FI = Foraging index	$(V_1*V_2*V_3)$	
HSI =	$(V_1*V_2*V_3*V_4*V_5*V_6)^(1/2)$	
Mink		
% of year with surface water present	V_1	
% tree canopy cover	V_2	Used in palustrine forested (PFO) and palustrine shrub-scrub (PSS) HSI model
% shrub canopy cover	V_3	Used in PFO and PSS HSI model
% canopy cover of emergent vegetation	V_4	Used in PFO, PSS and palustrine emergent marsh (PEM) HSI model
% canopy cover of trees and shrubs within 100 m of the wetland's edge	V_5	
% shoreline cover within 1 m of water's edge	V_6	
SIW = Water Suitablilty Index	V_1	
SIRL = Cover index for riverine and lacustrine cover types	$(V_5*V_6)^(1/2)$	
HSI =	Lowest life requisite value for either water or cover	

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Appendix I - Habitat Suitability Index Models for Key Species

Parameters	Variables	Comments
Wood Duck		
Number of potentially suitable tree cavities/0.4 ha	V_1	
Number of nest boxes/0.4 ha that are predator proof and maintained	V_2	
% of the water surface covered by potential brood cover	V_4	
Density of Potential nest sites/0.4 ha	$(0.18*V_1)+(0.95*V_2)$	
Brood-rearing Index	V_4	
HSI =	Lowest life requisite value for either nesting or brood-rearing	
Bluegill		
% Pool area during average summer flow	V_1	
% Cover (Logs and other objects) within polls or littoral areas during summer	V_2	
% Cover (Vegetation)	V_3	
% littoral area during summer stratification	V_4	Used in Lacustrine HSI model
Average TDS level during growing season	V_5	Used in Lacustrine HSI model
Maximum monthly average turbidity during average summer flow	V_6	
pH range during growing season	V_7	
Minimum dissolved oxygen range during summer	V_8	
Salinity	V_9	
Temperature (Adult)	V_{10}	
Temperature (Embryo)	V_{11}	
Temperature (Fry)	V_{12}	
Temperature (Juvenile)	V_{13}	
Current Velocity (Adult)	V_{14}	
Current Velocity (Embryo)	V_{15}	
Current Velocity (Fry)	V_{16}	
Current Velocity (Juvenile)	V_{17}	
Stream Gradient	V_{18}	
Reservoir drawdown during spawning (Embryo)	V_{19}	Used in Lacustrine HSI model
Substrate Composition (Embryo)	V_{20}	
C_F = Food	$(V_1*V_2*V_3)^(1/3)$	
C_C = Cover	$V_2+V_3/2$	
C_{WQ} = Water Quality	$(V_6+V_7+2V_8+V_9+2[(V_{10}*V_{12}*V_{13})^(1/3)])/7$	
C_R = Reproduction	$(V_{11}*V_{15}*V_{20})^(1/3)$	
C_{OT}= Other	$(V_{14}+V_{16}+V_{17}/3)+V_{18}/2$	
HSI =	$(C_F*C_C*(C_{WQ}^(2))*C_R*C_{OT})^(1/6)$	
If C_{WQ} or C_R are $\leq$ 0.4, use lowest component rating as the species HSI		

Appendix I - Habitat Suitability Index Models for Key Species

Parameters	Variables	Comments
Snapping Turtle		
Food		
Mean Water temperature at mid-depth during summer ^{o}C	V_1	
Mean current velocity at mid-depth during summer (cm/s)	V_2	
% Canopy cover of aquatic vegetation in the littoral zone	V_3	
Winter Cover		
Maximum water depth greater than maximum ice depth	V_4	
% silt in substrate	V_5	
Reproduction		
Distance to small stream (km)	V_6	
Interspersion		
Distance to permanent water (km)	V_7	
SIF = Food Suitability Index	$(V_1*V_2*V_3)^(1/3)$	
SIWC = Winter Cover Suitability Index	V_4*V_5	
SIR = Reproduction Suitability Index	V_6	
SII = Interspersion Suitability Index	V_7	
HSI =	(SIF*SIWC*SIR)^(1/3)*SII	

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Appendix J

Wetland Coring Logs

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Part G: Transect Method

Hudson River PCBs Superfund Site
Soil Analysis Data Form:
Soil Clay Content in Disturbed Portions

Date: 9/12/03 Time: _____

Wetland Station #: 2 Weather Conditions: _____

Transect #: _____ Samplers: _____

Transect Length: _____

Has native soil been altered at any point along transect (yes/no): no

If yes, how long is/are the disturbed section(s)? —

Soil descriptions: complete only if disturbed soil area identified

	Horizon	Depth (cm)	Color	Texture	Other Descriptions
2-4	O	0-30	10R 4/1	—	root mat throughout, organics w/ some silt saturated
2-7	NA	0-34	G1 3/N	SAND	depositional sediment, some organics throughout not real "A" horizon, saturated
		0-30	G1 3/N	SAND	depositional sediment, some organics throughout not real "A" horizon, saturated
2-8					
		30-45	2.5Y 4/1	Coarser SAND	less organics

Notes:
Take soil profile to 20 inches.

Part G: Transect Method

Hudson River PCBs Superfund Site
Soil Analysis Data Form:
Soil Clay Content in Disturbed Portions

Date: 9/12/03 Time: _____

Wetland Station #: 1 Weather Conditions: _____

Transect #: _____ Samplers: GM, JS

Transect Length: _____

Has native soil been altered at any point along transect (yes/no): no

If yes, how long is/are the disturbed section(s)? NA

Soil descriptions: complete only if disturbed soil area identified

Horizon	Depth (cm)	Color	Texture	Other Descriptions
NA	0-25	5yr 4/1	SAND	Depositional sediment, some organics dispersed throughout, not a real "A" horizon, saturated
* refusal hit @ 25 cm				
NA	0-30	5yr 4/1	SAND	Depositional sediment, some organics throughout, not real "A" horizon, saturated
* refusal hit @ 30 cm				
NA	0-8	5yr 4/1	SAND/LOAM	same as above
Ae	8-20	GL 5/N	SILTY/CLAY/LOAM	saturated
* refusal hit @ 20 cm				

Notes:
Take soil profile to 20 inches.

Part G: Transect Method

Hudson River PCBs Superfund Site
Soil Analysis Data Form:
Soil Clay Content in Disturbed Portions

Date: 8/12/03

Time: _____

Wetland Station #: 3

Weather Conditions: _____

Transect #: —

Samplers: _____

Transect Length: —

Has native soil been altered at any point along transect (yes/no): no

If yes, how long is/are the disturbed section(s)? —

Soil descriptions: complete only if disturbed soil area identified

Horizon	Depth (cm)	Color	Texture	Other Descriptions
NA	0-34	GL 3/N	SAND	depositional SAND ; organic material w/ some silt saturated

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Notes:
Take soil profile to 20 inches.

Part G: Transect Method

Hudson River PCBs Superfund Site
Soil Analysis Data Form:
Soil Clay Content in Disturbed Portions

Date: 9/12/03 Time: _____

Wetland Station #: 4 Weather Conditions: _____

Transect #: _____ Samplers: _____

Transect Length: _____

Has native soil been altered at any point along transect (yes/no): no

If yes, how long is/are the disturbed section(s)? —

Soil descriptions: complete only if disturbed soil area identified

	Horizon	Depth (cm)	Color	Texture	Other Descriptions
2-1	NA	0-20	10yr 4/1	silt loam	no oxidized root channels; sample under 3" water; some organics throughout
	* refusal hit	@ 20cm			
2-9	O	0-35	7.5yr 8/1	—	organics w/some silt, saturated
2-4	O	0-33	10R 5/1	—	high organics with some silt, saturated

Notes:
Take soil profile to 20 inches.

Appendix K

Tables for Habitat Reassessment Data from 2004

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Table 1 - Unconsolidated River Bottom Data - 2004

Station Location				Inorganic Shoreline Substrate Components							Organic Substrate Components				Epifaunal Substrate/Available Cover (Low Gradient)				Pool Substrate Characterization (Low Gradient)			
Station Number	Quadrat	Northing	Easting	Bedrock	Boulder	Cobble	Gravel	Sand	Silt	Clay	Detritus	Muck-Mud	Marl	Mussels	Optimal	Suboptimal	Marginal	Poor	Optimal	Suboptimal	Marginal	Poor
UCB-2	1	1611329	734691					70	30		Trace		20	1				X			X	
UCB-2	2	1611269	734713					80	20		70		10	0			X			X		
UCB-2	3	1611235	734647					80	20		60		10	0			X				X	
UCB-2	4	1611189	734670			20	30	40	10		10		80	1			X					X
UCB-2	5	1611204	734617					80	20		Trace		10	2			X				X	
UCB-2	6	1611108	734657					90	10		30	70	10	0			X				X	
UCB-2	7	1611129	734557					60	40		10	80	10	2				X			X	
UCB-2	8	1611076	734559					80	20		30	10		0			X				X	
UCB-2	9	1611008	734570					90	10		10	Trace	50	0			X				X	
UCB-3	1	1597023	737267		50	30	10	10			Trace	20		2		X				X		
UCB-3	2	1596964	737305		50	30	10	10			Trace	30		1		X				X		
UCB-3	3	1596915	737327		60	30	10	Trace			Trace	30		2		X				X		
UCB-3	4	1596837	737351		40	20	20	10	10		Trace	40		3		X				X		
UCB-3	5	1596794	737385			Trace	20	30	50			70	10	2			X				X	
UCB-3	6	1597018	737322		10	50	30	Trace	10			50	Trace	2		X				X		
UCB-3	7	1596899	737373		10	10	Trace	20	50	10	Trace	80	Trace	1			X				X	
UCB-3	8	1596872	737407					20	70	10	Trace	80	Trace	1				X			X	
UCB-3	9	1596836	737416					20	70	10	10	70		1				X			X	

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Table 2 - Unconsolidated River Bottom Current Velocity - 2004

Station Number	River Section	Northing	Easting	Water Depth (cm)	Current Measurement	
					% Depth	Current Velocity (ft/s)
UCB-1	1	1614589	735351	283	20	1.57
					80	1.22
UCB-2	1	1611340	734680	220	20	0.43
					80	0.36
UCB-3	1	1597078	737345	255	20	0.48
					80	0.44
UCB-4	1	1594207	736997	300	20	0.84
					80	0.35
UCB-5	2	1567972	735156	257	20	0.38
					80	0.25
UCB-6	1	1614674	736040	363	20	0.83
					80	0.14

Notes:

Depths at which velocities were recorded are 20% and 80% of the total water column depth.

UCB-1 - West side of Rogers Island; east side of smaller island in the West River Channel

UCB-2 - ~300 yards south of Lock 7; west side of channel

UCB-3 - Just south of north end of Griffin Island ~100 yards south, east side of channel

UCB-4 - South end of Griffin Island ~300 yards north of south tip, west side of channel

UCB-5 -~300 yards north of Northumberland Bridge; east side of channel

UCB-6 - East side of Roger's Island above POTW outfall

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Table 3a - Aquatic Vegetation Bed Data - 2004

Station	Quadrat	Species	Northing	Easting	Species Biomass (g/quad)	No. Stems spp	Total Biomass (g/m^2)[1]	Total Stem Density (stems/m2)[1]	Percent Cover	Depth (cm)	K (mg/kg)	PO4 (mg/kg)	NH4 (mg/kg)
SAV 4	1	Va	1610808	734250	10.64	15	85.12	120	30	216			
SAV 4	2	Va	1610804	734214	14.73	26	117.84	208	60	90			
SAV 4	3	Va	1610755	734210	15.94	28	127.52	224	60	215			
SAV 4	4	Va	1610646	734112	6.68	20	53.44	160	40	211			
SAV 4	5	Va	1610621	734093	4.87	13	38.96	152	30	108	0.94	14.2	0.82
SAV 4	5	Pg			0.53	6	4.24						
SAV 4	6	Va	1610352	733869	12.14	46	97.12	368	70	107			
SAV 4	7	Va	1610296	733850	4.87	15	38.96	120	50	180			
SAV 4	8	Va	1610200	733843	10.4	40	83.2	320	70	180			
SAV 4	9	Va	1610121	733884	7.05	29	56.4	232	60	228			

Notes:

1. Total biomass and Total Shoot Density are the sum of the quadrat values multiplied by 8 to convert to m^2.

Table 3b - Aquatic Vegetation Shoot Length (centimeters)

Station	Quadrat	Species	Length	Length	Length	Length	Length	Length	Length	Length	Length	Length
SAV 4	1	Va	80.2	90.7	151.9	75.4	99.8	143.4	110.5	42.6	111.8	92.4
SAV 4	2	Va	65.1	93.3	77.1	89.4	114.4	92.6	68.3	77.1	79.1	53.1
SAV 4	3	Va	70.1	126.8	78.8	163.4	104.9	102	179.9	118.8	103.5	76.9
SAV 4	4	Va	117.1	164.2	178.5	143.7	90.7	41.9	121.7	51.5	83.2	98.9
SAV 4	5	Va	120.5	60.5	87.3	186.6	73.5	81.5	64.4	122.7	85	46.8
SAV 4	5	Pg	25.6	58.2	37.7	23.5	28.2	23.3				
SAV 4	6	Va	59.5	57.3	82.5	90.4	55.4	83.4	95.2	58.3	83.7	81.1
SAV 4	7	Va	124.6	16.5	42.7	40.4	82	31.7	109	24.4	83.4	29.5
SAV 4	8	Va	62.5	55.1	82.6	114.4	101.9	114.7	108	72.1	102.6	73
SAV 4	9	Va	144.1	26	57.6	81.7	34.2	148.7	161.6	96.3	63.4	146.2

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Table 4 - Aquatic Vegetation Bed Current Velocity - 2004

Current Velocity Measurements						
	Center of Bed			Outside Edge of Bed		
Station	Water Depth (cm)	% Depth	Velocity (ft/s)	Water Depth (cm)	% Depth	Velocity (ft/s)
1	162	20	1.93	N/A*		N/A*
		80	0.29			N/A*
2	156	20	0.05	275	20	0.49
		80	0.04		80	0.21
3	134	20	0.25	258	20	0.2
		80	0.05		80	0.17
4	186	20	0.4	381	20	0.8
		80	0.16		80	0.39
5	112	20	0.42	199	20	0.65
		80	0.04		80	0.54
6	215	20	0.56	310	20	0.83
		80	0.22		80	0.07
7	201	20	0	233	20	0.25
		80	0		80	0.14
8	94	20	0.19	243	20	0.15
		80	0.12		80	0.22
9	123	20	0.85	250	20	0.5
		80	0.01		80	0.62

Notes:

* No outside edge of bed, vegetation all the way across the channel.

Depths at which velocities were recorded are 20% and 80% of the total water column depth.

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Table 5 - Shoreline Station Data - 2004

					Inorganic Shoreline Substrate Components						Bank Assessment Components				Bank Vegetation Components				Riparian Edge - Cover Components				
Station	River Section	Northing	Easting	Bedrock	Boulder	Cobble	Gravel	Sand	Silt	Clay	Stable	Mod. Stable	Mod. Unstable	Unstable	Optimal	Suboptimal	Marginal	Poor	Canopy	Understory	Herbaceous	Adjacent Landuse	Dominant Species
SHO-IR.01	1	1616232	733577					60	30	10		90	10			100			20	Trace	100	Forested, non-resident, non-commercial	Silver maple, green ash, dogwood, sensitive fern, reed canary grass, joe pye weed
SHO-IR.02	1	1616128	733659					60	30	10		100			100				50	10	100	Forested, non-resident, non-commercial	Silver maple, green ash, dogwood, sensitive fern, reed canary grass, joe pye weed, dogbane
SHO-IR.03	1	1616021	733789					60	30	10	100				100				20	30	100	Forested, non-resident, non-commercial	Cottonwood, green ash, silver maple, dogwood bittersweet, sensitive fern, royal fern
SHO-2I.01	1	1614042	735536					70	20	Trace		100			100				60	80	30	Forested, non-resident, non-commercial	Green ash, American elm, basswood, American bladdernut, bittersweet, honeysuckle, reed canary grass, wild grape, sensitive fern
SHO-2I.02	1	1613901	735492					70	20	Trace		100			100				60	50	90	Forested, non-resident, non-commercial	Silver maple, green ash, American bladdernut, alder, sensitive fern, white snakeroot, reed canary grass
SHO-2I.03	1	1613638	735553					60	30	Trace	100					100			80	40	70	Forested, non-resident, non-commercial	Silver maple, sumac, honeysuckle, buttonbush, sensitive fern, reed canary grass
SHO-6I.01	1	1597303	737351		10	50	40				100					100			20	40	90	Res to Bank, Maintained	Blk Locust, American elm, silver maple, sugar maple, honeysuckle, iris, reed canary grass
SHO-6I.02	1	1597082	737421				60	30	10			50	50			100			80	30	60	Res to Bank, Maintained	Silver maple, white ash, alder, black locust, honeysuckle, poison ivy, grasses
SHO-6I.03	1	1596795	737507				100	Trace			100				100				90	50	90	Res to Bank, Maintained	Silver maple, white ash, alder, black locust, sugar maple, white oak, dogwood, elm, reed canary grass, iris
SHO-9I.01	2	1567293	734600				10	10	10	70		50	50		100				50	70	90	Vegetated steep slope to mowed lawn	Sugar maple, white pine, dogwood, green ash, ground nut, aster
SHO-9I.02	2	1567070	734658				Trace	70	30	Trace		70	30			100			80	50	20	Forested, non-resident, non-commercial	Sugar maple, white pine, honeysuckle, dogwood, misc. saplings
SHO-91.03	2	1566869	734729			10		50	10	30		80	20			100			40	70	80	Forested, non-resident, non-commercial	Sugar maple, black willow, American elm, honeysuckle, sumac, wild grape, Virginia creeper, reed canary grass, grasses

Notes:

1. Due to elevated water level, offshore GPS points and slope measurements were not taken.
2. Due to elevated water level, Table C-3 Organic Shoreline Substrate Components was not completed.

General Electric Company
Hudson River PCBs Superfund Site
Habitat Delineation and Assessment

Table 6 - Wetland Data - 2004

								STEM LENGTHS										STEM DIAMETER									
Wetland Number	Quadrat	Species	Northing	Easting	Live/Dead	Biomass	No. Stems	Stem1	Stem2	Stem3	Stem4	Stem5	Stem6	Stem7	Stem8	Stem9	Stem10	Stem1	Stem2	Stem3	Stem4	Stem5	Stem6	Stem7	Stem8	Stem9	Stem10
3	1	Lo	1575751	737000	L	13.53	527	26.04	21.27	27.31	25.56	23.18	29.37	29.21	19.05	29.37	33.66	1	1.1	1.1	1.3	1	1.2	1.1	1	1.1	1.2
3	1	Sv			L	13.33	611	19.05	26.35	15.88	25.40	18.89	24.13	24.61	24.45	18.73	20.16	1.1	1.2	1.1	1.3	0.9	1.1	1.4	1.1	1	1.1
3	1	Er			L	1.57	160																				
3	2	Lo	1575800	736979	L	139.53	1978	73.34	42.23	62.55	46.36	56.52	48.58	40.80	33.66	51.75	53.98	1.1	0.8	1	1	0.9	0.8	0.7	0.8	1	0.8
3	2	Ew			L	2.82	9	51.12	29.53	38.74	52.07	41.59	41.43	33.50	31.12	49.05		3.7	2	2.6	3.5	3	2.8	2	2.5	2.2	
3	2	Sv			L	0.08	7																				
3	2	Pc			L	1.98	4																				
3	2	Pp			L	0.57	2																				
3	3	Lo	1575928	736958	L	115.84	821	7.59	7.92	5.98	4.35	6.06	5.21	5.06	4.32	3.09	7.09	1	1.1	1.1	1.1	0.9	1.7	1	1	1.1	0.5
3	3	Lp			L	0.25	6	1.16	13.5	23.2	13.4	18.1	15.6					1	1.5	1.6	1	1.5	1				
3	3	Ew			L	0.32	2																				

Notes:

Rice Cut Grass	Lo
Pickerel Weed	Pc
Walter Millet	Ew
Spike Rush	Er
Soft Stemmed Bull Rush	Sv
Water Smartweed	Pp
Water Purselane	Lp

Appendix L

Completed Wildlife Observation Forms

BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

WETLAND ASSESSMENT
WILDLIFE OBSERVATIONS

Table E-1
Fish and Wildlife Survey Form

Date (mm/dd/yyyy): 09/09/03 STATION: Wetland 1 Page 1 of 1

Time: Start 1100A, Stop: 1230p Weather Conditions: Sunny, 75, no wind

Species Name	Number Obs.	Sight Code	Sign Code	Observer's Initials	Habitat Type / Location (approximate)
Green frog	25	RS		RCD, JS	Sparganium dominated marsh
Woodpecker	1		DHB	JS	Dead tree in wetland
Whitetail deer	1		FG	JS, RCD	browsing on common bidens - wetland
Sunfish	6		SW	PB, JS	along deep edge of wetland in Val
Bluegill	4		SW	PB, JS	" " " "

Instructions:

- Enter species common name in column 1 and number observed in column 2
- Select appropriate "sight" or "sign" codes from below and enter into designated boxes
- Enter initials of Observer
- Enter habitat where species was observed and approximate location in river
- Note exotic species if observed

Sight Codes:

FG	foraging
FE	feeding
RS	resting, perching
CA	calling
FL	flight
SW	other: swimming

Sign Codes:

SC	scat	CA	call
SL	slide	NE	nest
DHB	den, hut, burrow	TR	tracks
TR	tracks	FG	browse
DB	day bed	____	other: ____

Narrative

Fringing wetland along west side of Thompson Island. Sparganium eurycarpum dominant plant w/ wildrice, Ludwigia palustris, numerous sedges intermixed w/ Zizania aquatic (wild rice) more common in deeper areas.

Table E-1
Fish and Wildlife Survey Form

Date (mm/dd/yyyy): 09/09/03

STATION: WETLAND 2

Page 1 of 1

Time: Start 1415p; stop:

Weather Conditions: Sunny, 75°F, no wind

Species Name	Number Obs.	Sight Code	Sign Code	Observer's Initials	Habitat Type / Location (approximate)
Smallmouth bass	1	SW		RCD, JS	muddy bottom inshore of SAV; water ≈ 1'
Minnows spp	1 (many schools)	SW		RCD, PB	" " off wetland edge; water 3-6" deep

Instructions:

- Enter species common name in column 1 and number observed in column 2
- Select appropriate "sight" or "sign" codes from below and enter into designated boxes
- Enter initials of Observer
- Enter habitat where species was observed and approximate location in river
- Note exotic species if observed

Sight Codes:

FG	foraging
FE	feeding
RS	resting, perching
CA	calling
FL	flight
SW	other: swimming

Sign Codes:

SC	scat
SL	slide
DHB	den, hut, burrow
TR	tracks
DB	day bed
CA	call
NE	nest
TR	tracks
FG	browse
___	other: _____

Narrative

Narrow fringing wetland close to River Rd. Bare patches intermixed with wetland veg. Purple loosestrife common along transition zone from wetland to upland, along w/ reed canary grass.

Table E-1
Fish and Wildlife Survey Form

Date (mm/dd/yyyy): 09/10/03 STATION: WETLAND 3 Page 1 of 1

Time: Start 1:10; stop 1:40 Weather Conditions: Sunny low 70's, slight NW wind

Species Name	Number Obs.	Sight Code	Sign Code	Observer's Initials	Habitat Type / Location (approximate)
Largemouth bass	1	SW		RCD, JS	Shallow water inshore Va bed.
Common egret	1	FG		RCD, PB	Shallow water @ edge of wetland
Minnows sp.	1 school	SW		RCD, JS	Shallow water

Instructions:
- Enter species common name in column 1 and number observed in column 2
- Select appropriate "sight" or "sign" codes from below and enter into designated boxes
- Enter initials of Observer
- Enter habitat where species was observed and approximate location in river
- Note exotic species if observed

Sight Codes:		Sign Codes:			
FG	foraging	SC	scat	CA	call
FE	feeding	SL	slide	NE	nest
RS	resting, perching	DHB	den, hut, burrow	TR	tracks
CA	calling	TR	tracks	FG	browse
FL	flight	DB	day bed	___	other: _____
SW	other: SW/swimming				

Narrative
Fringing wetland dominated by Millet and rice cutgrass. Ground cover of Ludwigia palustris varies from 10-50%. Large schools of minnows along water's edge of wetland. Egret observed hunting for minnows, but not catching

Wetland K. T.1.P
1 PB

Table E-1
Fish and Wildlife Survey Form

Date (mm/dd/yyyy): 9,11,03
Time: 2.42 PM

Page ___ of ___

Weather Conditions: clear + warm

Species Name	Number Obs.	Sight Code	Sign Code	Observer's Initials	Habitat Type / Location (approximate)
mallards	6	FE		PB	FRINGE WETLAND
LONG TAIL WEASEL	1	FG	TR	PB	
SMALL MOUTH BASS	3 +	FG		PB	IN SHALLOWS
MINNOWS		FE		PB	" "
BLUE GILL SUNFISH	10 +	FG		PB	" "
LEOPARD FROGS	3	FL		PB	IN WILD RICE

Instructions:
- Enter species common name in column 1 and number observed in column 2
- Select appropriate "sight" or "sign" codes from below and enter into designated boxes
- Enter initials of Observer
- Enter habitat where species was observed and approximate location in river
- Note exotic species if observed

Sight Codes:

FG	foraging
FE	feeding
RS	resting, perching
CA	calling
FL	flight
___	other: _____

Sign Codes:

SC	scat
SL	slide
DHB	den, hut, burrow
TR	tracks
DB	day bed
CA	call
NE	nest
TR	tracks
FG	browse
___	other: _____

Narrative
this area has many dead trees + snags a good area for mink + weasel. affords cover for prey species

Wetland #2

Table E-1
Fish and Wildlife Survey Form

Date (mm/dd/yyyy): 9,11,03

Page 1 of 1

Time: 4.10 PM

Weather Conditions: Clear + Warm

Species Name	Number Obs.	Sight Code	Sign Code	Observer's Initials	Habitat Type / Location (approximate)
Gr. Blue Heron	1		TR	PB	Fringe Wetland
mus Yeato	2		TR	PB	" "
Grey Squirrel	1		TR	PB	"
Mallard	7 Juvenile +			PB	in shallows
Long Eared Sunfish	5 +			PB	" "

Instructions:

- Enter species common name in column 1 and number observed in column 2
- Select appropriate "sight" or "sign" codes from below and enter into designated boxes
- Enter initials of Observer
- Enter habitat where species was observed and approximate location in river
- Note exotic species if observed

Sight Codes:

FG	foraging
FE	feeding
RS	resting, perching
CA	calling
FL	flight
___	other: _____

Sign Codes:

SC	scat
SL	slide
DHB	den, hut, burrow
TR	tracks
DB	day bed
CA	call
NE	nest
TR	tracks
FG	browse
___	other: _____

Narrative mud flat on west riverside.

Wetland #3

Table E-1
Fish and Wildlife Survey Form

Date (mm/dd/yyyy): 9/11/03

Page 1 of 1

Time: 1.45 PM

Weather Conditions: Clear & Warm

Species Name	Number Obs.	Sight Code	Sign Code	Observer's Initials	Habitat Type / Location (approximate)
MUSKRAT	3 ?	FG	TR	PB	MILLET STAND WETLAND
DEER MOUSE	1	FG	TR	PB	" "
WATERFOWL	?	FG	TR	PB	
WHITE TAIL DEER		FE	TR	PB	SAGITTARIA LATIFOLIA
MUSSELS	THOUSAND +		TR.		IN SHALLOWS
MINNOWS	" "	FE		PB	" "

Instructions:

- Enter species common name in column 1 and number observed in column 2
- Select appropriate "sight" or "sign" codes from below and enter into designated boxes
- Enter initials of Observer
- Enter habitat where species was observed and approximate location in river
- Note exotic species if observed

Sight Codes:

FG	foraging
FE	feeding
RS	resting, perching
CA	calling
FL	flight
___	other: _____

Sign Codes:

SC	scat
SL	slide
DHB	den, hut, burrow
TR	tracks
DB	day bed
CA	call
NE	nest
TR	tracks
FG	browse
___	other: _____

Narrative

this area is well used by waterfowl + aquatic ~~mammals~~ mammals, songbirds etc

Welland #4

Table E-1
Fish and Wildlife Survey Form

Date (mm/dd/yyyy): 9/11/03

Time: 10.17 AM

Weather Conditions: SUNNY + WARM.

GENERAL GPS 43.07.870 73.35.262

Species Name	Number Obs.	Sight Code	Sign Code	Observer's Initials	Habitat Type / Location (approximate)
BELTED KINGFISHER	2	FL	CA	PB	FRINGE WETLAND EAST SHORE
ASSORTED MUSSELS	100 + SIGHT	TR		PB	IN SHALLOW WATER
POND SNAIL	SIGHT			PB	" "
MINNOWS	THOUSAND. +	FE			" "
LD COTTING BEAVER				PB	
MUSKRAT		FE	DB	PB	PICKEREL WEED BED FEED STATION
BULL FROG		FL			" " "
GREEN FROGS	4	FL		PB	" " "
GR. BLUE HERON	1	FE		PB	" " "

Instructions:
- Enter species common name in column 1 and number observed in column 2
- Select appropriate "sight" or "sign" codes from below and enter into designated boxes
- Enter initials of Observer
- Enter habitat where species was observed and approximate location in river
- Note exotic species if observed

Sight Codes:
FG foraging
FE feeding
RS resting, perching
CA calling
FL flight
___ other: _____

Sign Codes:
SC scat
SL slide
DHB den, hut, burrow
TR tracks
DB day bed
CA call
NE nest
TR tracks
FG browse
___ other: _____

Narrative: these sightings were taken at north rumberland upper Hudson River.

SHORELINE.
WILDLIFE OBSERVATIONS

Table E-1
Fish and Wildlife Survey Form

Date (mm/dd/yyyy): 09 / 08 / 03 STATION: SHO-1R Page 1 of ___

Time: start: 10:24a/stop: Weather Conditions: Mostly sunny; mid 70's; slight breeze

Species Name	Number Obs.	Sight Code	Sign Code	Observer's Initials	Habitat Type / Location (approximate)
Red breasted robin	1	FL	CA	RCD	Canopy, ~ 50m into bank
Muskrat	1		TR	SPT	Riverbank

Instructions:
- Enter species common name in column 1 and number observed in column 2
- Select appropriate "sight" or "sign" codes from below and enter into designated boxes
- Enter initials of Observer
- Enter habitat where species was observed and approximate location in river
- Note exotic species if observed

Sight Codes:

FG	foraging
FE	feeding
RS	resting, perching
CA	calling
FL	flight
___	other: _____

Sign Codes:

SC	scat
SL	slide
DHB	den, hut, burrow
TR	tracks
DB	day bed
CA	call
NE	nest
TR	tracks
FG	browse
___	other: _____

Narrative
Transect 1: 10^24 - 11^30 - forested floodplain adjacent to river; muskrat tracks along shore near abandon den
Transect 2: 11^35 - 12^05 - no observations

Table E-1
Fish and Wildlife Survey Form

Date (mm/dd/yyyy): 09/08/03

Time: _____ Weather Conditions: 70s SUNNY NICE BREEZE

LOCATION SHO-II

Species Name	Number Obs.	Sight Code	Sign Code	Observer's Initials	Habitat Type / Location (approximate)	TRANSECT NUMBER
SQUIRREL	1	—	TR	SJT	TRACKS OBS. ON MUDFLAT/RIVERBANK	TRANS 2
BEAVER	1	—	OTH	SML	EVIDENCE OF WORK ON FALLEN TREE	TRANS 2
GREEN BACK HERON	1	—	TR	SJT	TRACKS IN MUD AT WATER'S EDGE	TRANS 3

Instructions:

- Enter species common name in column 1 and number observed in column 2
- Select appropriate "sight" or "sign" codes from below and enter into designated boxes
- Enter initials of Observer
- Enter habitat where species was observed and approximate location in river
- Note exotic species if observed

Sight Codes:

FG	foraging
FE	feeding
RS	resting, perching
CA	calling
FL	flight
___	other: _____

Sign Codes:

SC	scat	CA	call
SL	slide	NE	nest
DHB	den, hut, burrow	TR	tracks
TR	tracks	FG	browse
DB	day bed	OTH	other: _____

Narrative

Table E-1
Fish and Wildlife Survey Form

Date (mm/dd/yyyy): 09/08/03

Time: _____

Weather Conditions: 70's SUNNY, NNE BREEZE

LOCATION SHO-2.I

Species Name	Number Obs.	Sight Code	Sign Code	Observer's Initials	Habitat Type / Location (approximate)	TRANSECT NUMBER
WOOD DUCK	1	RS	—	SM	RESTING ON LOG & VEG PILE	1
KINGFISHER	1	~~CA~~	CA	SJT	IDENTIFIED BY CALL - SIGHT UNSEEN	1
MALLARD	2	SW	-	SM	SWIMMING UNDER OVERHANGING TREES	2
GREAT BLUE HERON	1	—	TR	SJT	3" WATER ON MUDFLAT	2
" " "	1	—	TR	SJT	" " "	3

Instructions:

- Enter species common name in column 1 and number observed in column 2
- Select appropriate "sight" or "sign" codes from below and enter into designated boxes
- Enter initials of Observer
- Enter habitat where species was observed and approximate location in river
- Note exotic species if observed

Sight Codes:

FG	foraging
FE	feeding
RS	resting, perching
CA	calling
FL	flight
SW	other: _____

Sign Codes:

SC	scat
SL	slide
DHB	den, hut, burrow
TR	tracks
DB	day bed
CA	call
NE	nest
TR	tracks
FG	browse
____	other: _____

Narrative

Table E-1
Fish and Wildlife Survey Form

Date (mm/dd/yyyy): 9/9/03

Page 1 of 1

Time: 1145-1245

Weather Conditions: 70's Sunny

SHO-2R

Species Name	Number Obs.	Sight Code	Sign Code	Observer's Initials	Habitat Type / Location (approximate)	TRANSECT
CHIPMUNK	1	-	CA	SJT	Unseen - above bank - out of sight	1
CATBIRD	1	-	CA	II	(SAA)	1
Crows	2	-	FL	SJT	Overhead Circling	2
Turkey Vulture	2	-	FL	SJT	Overhead Circling	2
Turkey Vulture	1	-	FL	II	Flight low, across river	3
Blue Jay	1	-	CA	SJT	Unseen	3
Chipmunk	1	-	RN	II	Running across dumped Budweiser store	3
Woodpecker	multi-hole	-	TR	SJT	Holes in dead tree	3
fish (N.o.S.)	1	MRT	-	SAA	Dead - rotting on bank	3

Instructions:

- Enter species common name in column 1 and number observed in column 2
- Select appropriate "sight" or "sign" codes from below and enter into designated boxes
- Enter initials of Observer
- Enter habitat where species was observed and approximate location in river
- Note exotic species if observed

	Sight Codes:	Sign Codes:	
FG	foraging	SC scat	CA call
FE	feeding	SL slide	NE nest
RS	resting, perching	DHB den, hut, burrow	TR tracks
CA	calling	TR tracks	FG browse
FL	flight	DB day bed	____ other: _____
RN	other: _____		

Narrative

Table E-1
Fish and Wildlife Survey Form

Date (mm/dd/yyyy): 09 / 09 / 03 Page 1 of 1

Time: 0855 - 0910 Weather Conditions: 60's Sunny

SITE-3T

Species Name	Number Obs.	Sight Code	Sign Code	Observer's Initials	Habitat Type / Location (approximate)	TRANSECT NUMBER
WOODCHUCK	1	—	DHB	SJT	Hole cut into bank, active	1
WOODPECKER	1	—	TR	SMC	Hole in Elm tree	2
WOODCHUCK	1	—	DBH	SJT	Old inactive hole on bank - steep	2
BLUE JAY	2	RS/FL	—	SMC	Top of elm, perched & calling	3
CHICKADEE	3	—	CA	SJT	Top of trees, perched	3
MALLARD	2	SW	—	SJT	Swimming near E shore of Hayes Isl.	3

Instructions:

- Enter species common name in column 1 and number observed in column 2
- Select appropriate "sight" or "sign" codes from below and enter into designated boxes
- Enter initials of Observer
- Enter habitat where species was observed and approximate location in river
- Note exotic species if observed

Sight Codes:		Sign Codes:			
FG	foraging	SC	scat	CA	call
FE	feeding	SL	slide	NE	nest
RS	resting, perching	DHB	den, hut, burrow	TR	tracks
CA	calling	TR	tracks	FG	browse
FL	flight	DB	day bed	SW	other: swimming
___	other: _____				

Narrative

Table E-1
Fish and Wildlife Survey Form

Date (mm/dd/yyyy): 09/09/03 Page 1 of 1

Time: S: 1005 E: Weather Conditions: 70 Sunny

LOCATION: SHO-41.xx

Species Name	Number Obs.	Sight Code	Sign Code	Observer's Initials	Habitat Type / Location (approximate)	TRANSECT NUMBER
Kingfisher	1	-	CA	SJT	Opposite bank	1
Chickadee	few	-	CA	JI	Ash tree	1
~~Phoebe~~	1	-	CA	SML	Grassland - lot.	1
Chickadee	few	-	CA	SJT		2
WOODPECKER	6 Holes	-	TR	SML/JI	6 holes in old dead tree	2
Chickadee	few	-	CA	JI		3
Kingfisher	1	-	CA	JI		3

Instructions:

- Enter species common name in column 1 and number observed in column 2
- Select appropriate "sight" or "sign" codes from below and enter into designated boxes
- Enter initials of Observer
- Enter habitat where species was observed and approximate location in river
- Note exotic species if observed

Sight Codes:

FG	foraging
FE	feeding
RS	resting, perching
CA	calling
FL	flight
____	other: _____

Sign Codes:

SC	scat
SL	slide
DHB	den, hut, burrow
TR	tracks
DB	day bed
CA	call
NE	nest
TR	tracks
FG	browse
____	other: _____

Narrative

Table E-1
Fish and Wildlife Survey Form

Date (mm/dd/yyyy): 9/9/03

Time: 1255

Weather Conditions: 70's Sunny

E: Location: SHO-5I

Species Name	Number Obs.	Sight Code	Sign Code	Observer's Initials	Habitat Type / Location (approximate)	
White Sucker	1	MORT	—	ALL	Belly up - floating	1
Blue Head Catfish	1	MORT	-	II	Carcass on bank	1
Turkey	1	-	TR	II	Tracks in mud of driveway	1
Fox	1	-	TR	II	" " "	1
Woodpecker	1	-	CA	II	Holes also seen	1
Turkey Vulture	1	-	FL	II	Fly over	2

Instructions:

- Enter species common name in column 1 and number observed in column 2
- Select appropriate "sight" or "sign" codes from below and enter into designated boxes
- Enter initials of Observer
- Enter habitat where species was observed and approximate location in river
- Note exotic species if observed

Sight Codes:

FG	foraging
FE	feeding
RS	resting, perching
CA	calling
FL	flight
____	other: _____

Sign Codes:

SC	scat	CA	call
SL	slide	NE	nest
DHB	den, hut, burrow	TR	tracks
TR	tracks	FG	browse
DB	day bed	____	other: _____

Narrative

Table E-1
Fish and Wildlife Survey Form

Date (mm/dd/yyyy): 9/9/03

Page 1 of 1

Time: 8:1415

Weather Conditions: 70s Sunny

STO-6I

Species Name	Number Obs.	Sight Code	Sign Code	Observer's Initials	Habitat Type / Location (approximate)
GROUNDHOG/WOODCHUCK	1	-	DHB	SM	HOLE, ACTIVE ON BANK
WHITE BREASTED NUTHATCH	2	DS	CA	II	IN elm tree
WOODCHUCK	1	-	TR	SJT	Fresh Trx on bank/flat
KINGFISHER	1	FL	-	SJT	
SPARROW	1	-	CA	II	
CICADA	1	CA	CA	II	
CATBIRD	1	-	CA	SJT	

Instructions:
- Enter species common name in column 1 and number observed in column 2
- Select appropriate "sight" or "sign" codes from below and enter into designated boxes
- Enter initials of Observer
- Enter habitat where species was observed and approximate location in river
- Note exotic species if observed

Sight Codes:

FG	foraging
FE	feeding
RS	resting, perching
CA	calling
FL	flight
___	other: _____

Sign Codes:

SC	scat
SL	slide
DHB	den, hut, burrow
TR	tracks
DB	day bed
CA	call
NE	nest
TR	tracks
FG	browse
___	other: _____

Narrative

Table E-1
Fish and Wildlife Survey Form

Date (mm/dd/yyyy): 09/10/03 Page 1 of 1

Time: 03:15 SHO-3R Weather Conditions: SUNNY, 70's

Species Name	Number Obs.	Sight Code	Sign Code	Observer's Initials	Habitat Type / Location (approximate)	
DEER	1	—	TR	SL	TRACKS IN MUD	1
RACCOON	1	—	TR	SL	TRACKS IN MUD	1
SQUIRREL	1	—	TR	SL	TRACKS IN MUD	2
RACCOON	1	—	TR	SL	" " "	2
GBH	1	—	TR	SL	" " "	2
BLUESAY	1	—	CA	II		2

Instructions:

- Enter species common name in column 1 and number observed in column 2
- Select appropriate "sight" or "sign" codes from below and enter into designated boxes
- Enter initials of Observer
- Enter habitat where species was observed and approximate location in river
- Note exotic species if observed

Sight Codes:		Sign Codes:			
FG	foraging	SC	scat	CA	call
FE	feeding	SL	slide	NE	nest
RS	resting, perching	DHB	den, hut, burrow	TR	tracks
CA	calling	TR	tracks	FG	browse
FL	flight	DB	day bed	____	other: _____
____	other: _____				

Narrative

Table E-1
Fish and Wildlife Survey Form

Date (mm/dd/yyyy): 9/10/03 Page 1 of 1

Time: _____ Weather Conditions: 70s Sunny

SHO-7I

Species Name	Number Obs.	Sight Code	Sign Code	Observer's Initials	Habitat Type / Location (approximate)	T / T2
MALLARD	~~2~~	~~FE~~	—	SW	Feeding in weed beds	1
Crow	1	—	CA	II	Call heard across backwater	1
Blue Jay	1	—	CA	II	" "	1
Raccoon	1	—	TR	SPT	Tracks on mud flat	1
Fox	1	—	TR	II	"	1
Squirrel	1	—	TR	II	"	1
Snail	1	~~FG~~	—	II		1
RACCOON	1	—	TR	II	TRACKS ON MUDFLAT	2
CROW	1	—	CA	II	CALL HEARD	2
SQUIRREL	1	—	TR	SPT	TRACK ON MUDFLAT	2

Instructions:
- Enter species common name in column 1 and number observed in column 2
- Select appropriate "sight" or "sign" codes from below and enter into designated boxes
- Enter initials of Observer
- Enter habitat where species was observed and approximate location in river
- Note exotic species if observed

Sight Codes:		Sign Codes:			
FG	foraging	SC	scat	CA	call
FE	feeding	SL	slide	NE	nest
RS	resting, perching	DHB	den, hut, burrow	TR	tracks
CA	calling	TR	tracks	FG	browse
FL	flight	DB	day bed	____	other: _____
____	other: _____				

Narrative

Table E-1
Fish and Wildlife Survey Form

Date (mm/dd/yyyy): 09/10/03 Page 1 of 1

Time: 8:1255 E: 8I Weather Conditions: 70's SUNNY NNE BREEZE

LOCATION: SHO-82 CR

Species Name	Number Obs.	Sight Code	Sign Code	Observer's Initials	Habitat Type / Location (approximate)	TRANSECT NUMBER
BULLHEAD CATFISH	1	MORT	—	II	BELLY UP FLOATING ALONG SHORE	1
GEESE	2+	—	CA	II	IN TRANSIT TO TRNS 3, HEARD CALL	2
GEESE	8	FL	—	II	FLYING N	

Instructions:
- Enter species common name in column 1 and number observed in column 2
- Select appropriate "sight" or "sign" codes from below and enter into designated boxes
- Enter initials of Observer
- Enter habitat where species was observed and approximate location in river
- Note exotic species if observed

Sight Codes:		Sign Codes:			
FG	foraging	SC	scat	CA	call
FE	feeding	SL	slide	NE	nest
RS	resting, perching	DHB	den, hut, burrow	TR	tracks
CA	calling	TR	tracks	FG	browse
FL	flight	DB	day bed	____	other: _____
____	other: _____				

Narrative

Table E-1
Fish and Wildlife Survey Form

Date (mm/dd/yyyy): 09/10/07

Time: B: 1540 E: 1620

Weather Conditions: Sunny 70s

LOCATION: SHO-9I

Species Name	Number Obs.	Sight Code	Sign Code	Observer's Initials	Habitat Type / Location (approximate)
NO	OBSERVATIONS				

Instructions:

- Enter species common name in column 1 and number observed in column 2
- Select appropriate "sight" or "sign" codes from below and enter into designated boxes
- Enter initials of Observer
- Enter habitat where species was observed and approximate location in river
- Note exotic species if observed

Sight Codes:

FG	foraging
FE	feeding
RS	resting, perching
CA	calling
FL	flight
___	other: _____

Sign Codes:

SC	scat
SL	slide
DHB	den, hut, burrow
TR	tracks
DB	day bed
CA	call
NE	nest
TR	tracks
FG	browse
___	other: _____

Narrative

Table E-1
Fish and Wildlife Survey Form

Date (mm/dd/yyyy): 09 / 11 / 03

Time: B: 0900 E:

Weather Conditions: HIGH 70's SUNNY

SHO - 10 I

Species Name	Number Obs.	Sight Code	Sign Code	Observer's Initials	Habitat Type / Location (approximate)	TRAN
GBH	~~1~~ Few	–	TR	SPT	TRACKS IN MUD	1
small weasel	few	–	TR	SPT	TRACKS IN MUD	1
GBH	Few	–	TR	SPT	TRACKS IN MUD	2
MINK	1	–	TR	SPT	TRACKS IN MUD	2
CHIPMUNK	1	–	TR	SPT	TRACKS IN MUD	2
FOX	1	–	TR	SPT	TRACKS IN MUD	2
GBH	2	FL	–	II	2 GBH'S FLYING E	3
MUSKRAT	1	–	TR	SPT	TRACKS IN MUD	3
FOX	1	–	TR	SPT	TRACKS IN MUD	3
CHIPMUNK	1	–	TR	SPT	TRACKS IN MUD	3

Instructions:

- Enter species common name in column 1 and number observed in column 2
- Select appropriate "sight" or "sign" codes from below and enter into designated boxes
- Enter initials of Observer
- Enter habitat where species was observed and approximate location in river
- Note exotic species if observed

Sight Codes:

FG	foraging
FE	feeding
RS	resting, perching
CA	calling
FL	flight
____	other: _____

Sign Codes:

SC	scat
SL	slide
DHB	den, hut, burrow
TR	tracks
DB	day bed
CA	call
NE	nest
TR	tracks
FG	browse
____	other: _____

Narrative

Table E-1
Fish and Wildlife Survey Form

Date (mm/dd/yyyy): 09/11/03 Page 1 of 1

Time: 11:11 Weather Conditions: Sunny, 70's, light breeze

SHO-11I

Species Name	Number Obs.	Sight Code	Sign Code	Observer's Initials	Habitat Type / Location (approximate)	TRAN
BEAVER	1	—	TR	SPT	OLD SIGNS OF BEAVER CHEWS + TRACKS	1
GBH	1	—	TR	SPT	TRACKS IN MUD	1
GBH	1	—	CA	II	CALL HEARD TO THE NORTH	2
SMALL RODENT BURROWS	several	—	DHB	SPT	SMALL UNIDENTIFIABLE BURROWS	2
N. LEOPARD FROG	10	RS	—	SPT	HOPING ONSHORE	3
chipmunk	1	FG	—	SPT	ON SHORE	3
HERON	1	—	SC	SPT	HERON SCAT ON SHORE	3

Instructions:

- Enter species common name in column 1 and number observed in column 2
- Select appropriate "sight" or "sign" codes from below and enter into designated boxes
- Enter initials of Observer
- Enter habitat where species was observed and approximate location in river
- Note exotic species if observed

Sight Codes:		Sign Codes:	
FG	foraging	SC scat	CA call
FE	feeding	SL slide	NE nest
RS	resting, perching	DHB den, hut, burrow	TR tracks
CA	calling	TR tracks	FG browse
FL	flight	DB day bed	____ other: _____
____	other: _____		

Narrative

WETLAND ASSESSMENT
WILDLIFE OBSERVATIONS

Table E-1
Fish and Wildlife Survey Form

Date (mm/dd/yyyy): 09/09/03 STATION: Wetland 1 Page 1 of 1

Time: Start 1100A; Stop: 1230p Weather Conditions: Sunny, 75, no wind

Species Name	Number Obs.	Sight Code	Sign Code	Observer's Initials	Habitat Type / Location (approximate)
Green frog	25	RS		RCD, JS	Sparganium dominated marsh
Woodpecker	1		DHB	JJ	Dead tree in wetland
White tail deer	1		FG	JS, RCD	browsing on common bidens - wetland
Sunfish	6		SW	PB, JS	along deep edge of wetland in Val
Bluegill	4		SW	PB, JS	" " " "

Instructions:

- Enter species common name in column 1 and number observed in column 2
- Select appropriate "sight" or "sign" codes from below and enter into designated boxes
- Enter initials of Observer
- Enter habitat where species was observed and approximate location in river
- Note exotic species if observed

Sight Codes:		Sign Codes:	
FG	foraging	SC scat	CA call
FE	feeding	SL slide	NE nest
RS	resting, perching	DHB den, hut, burrow	TR tracks
CA	calling	TR tracks	FG browse
FL	flight	DB day bed	____ other: _____
SW	other: swimming		

Narrative
Fringing wetland along west side of Thompson Island. Sparganium eurycarpum dominant plant w/ wildrice, Ludwigia palustris, numerous sedges intermixed w/ Zizania aquatic (wild rice) more common in deeper areas.

Table E-1
Fish and Wildlife Survey Form

Date (mm/dd/yyyy): 09/09/03 STATION: WETLAND 2 Page 1 of 1

Time: Start 1:45p; STOP: Weather Conditions: Sunny, 75°F, no wind

Species Name	Number Obs.	Sight Code	Sign Code	Observer's Initials	Habitat Type / Location (approximate)
Smallmouth bass	1	SW		RCD, JS	muddy bottom inshore of SAV; water ≈ 1'
Minnows spp.	1 (many schools)	SW		RCD, PB	" " off wetland edge; water 3-6" deep

Instructions:
- Enter species common name in column 1 and number observed in column 2
- Select appropriate "sight" or "sign" codes from below and enter into designated boxes
- Enter initials of Observer
- Enter habitat where species was observed and approximate location in river
- Note exotic species if observed

Sight Codes:		Sign Codes:			
FG	foraging	SC	scat	CA	call
FE	feeding	SL	slide	NE	nest
RS	resting, perching	DHB	den, hut, burrow	TR	tracks
CA	calling	TR	tracks	FG	browse
FL	flight	DB	day bed	____	other: _____
SW	other: swimming				

Narrative
Narrow fringing wetland close to River Rd. Bare patches intermixed with wetland veg. Purple loosestrife common along transition zone from wetland to upland, along w/ reed canary grass.

Table E-1
Fish and Wildlife Survey Form

Date (mm/dd/yyyy): 09/10/03 STATION: WETLAND 3 Page 1 of 1

Time: Start 1:10; stop 1:40 Weather Conditions: Sunny low 70's, slight NW wind

Species Name	Number Obs.	Sight Code	Sign Code	Observer's Initials	Habitat Type / Location (approximate)
Largemouth bass	1	SW		RCJ, JS	Shallow water inshore Va bed.
Common egret	1	FG		RCJ, PB	Shallow water @ edge of wetland
Minnows sp.	1 school	SW		RCJ, JS	Shallow water

Instructions:
- Enter species common name in column 1 and number observed in column 2
- Select appropriate "sight" or "sign" codes from below and enter into designated boxes
- Enter initials of Observer
- Enter habitat where species was observed and approximate location in river
- Note exotic species if observed

	Sight Codes:		Sign Codes:		
FG	foraging	SC	scat	CA	call
FE	feeding	SL	slide	NE	nest
RS	resting, perching	DHB	den, hut, burrow	TR	tracks
CA	calling	TR	tracks	FG	browse
FL	flight	DB	day bed	____	other: _____
SW	other: SW/MAning				

Narrative
Fringing wetland dominated by Millet and rice cutgrass. Ground cover of Ludwigia palustris varies from 10-50%. Large schools of minnows along water's edge of wetland. Egret observed hunting for minnows, but not catching

Wetland # T.1.P
1 PB

Table E-1
Fish and Wildlife Survey Form

Date (mm/dd/yyyy): 9,11,03
Time: 2.42 PM
Page ___ of ___
Weather Conditions: clear + warm

Species Name	Number Obs.	Sight Code	Sign Code	Observer's Initials	Habitat Type / Location (approximate)
mallards	6	FE		PB	FRINGE WETLAND
LONG TAIL WEASEL	1	FG	TR	PB	
SMALL MOUTH BASS	3 +	FG		PB	IN SHALLOWS
MINNOWS		FE		PB	" "
BLUE GILL SUNFISH	10 +	FG		PB	" "
LEOPARD FROGS	3	FL		PB	IN WILD RICE

Instructions:
- Enter species common name in column 1 and number observed in column 2
- Select appropriate "sight" or "sign" codes from below and enter into designated boxes
- Enter initials of Observer
- Enter habitat where species was observed and approximate location in river
- Note exotic species if observed

	Sight Codes:	Sign Codes:	
FG	foraging	SC scat	CA call
FE	feeding	SL slide	NE nest
RS	resting, perching	DHB den, hut, burrow	TR tracks
CA	calling	TR tracks	FG browse
FL	flight	DB day bed	____ other: _____
____	other: _____		

Narrative this area has many dead trees + snags a good area for mink + weasel. affords cover for prey species

Wetland #2

Table E-1
Fish and Wildlife Survey Form

Date (mm/dd/yyyy): 9/11/03 Page 1 of 1

Time: 4:10 PM Weather Conditions: clear + warm

Species Name	Number Obs.	Sight Code	Sign Code	Observer's Initials	Habitat Type / Location (approximate)
Gr. Blue Heron	1		TR	PB	Fringe Wetland
Muskrat	2		TR	PB	" " "
Ring-billed Gull	1		TR	PB	"
Mallard	7 Thousand +			PB	in shallows
Long Eared Sandpiper	5 +			PB	" "

Instructions:

- Enter species common name in column 1 and number observed in column 2
- Select appropriate "sight" or "sign" codes from below and enter into designated boxes
- Enter initials of Observer
- Enter habitat where species was observed and approximate location in river
- Note exotic species if observed

	Sight Codes:		Sign Codes:		
FG	foraging	SC	scat	CA	call
FE	feeding	SL	slide	NE	nest
RS	resting, perching	DHB	den, hut, burrow	TR	tracks
CA	calling	TR	tracks	FG	browse
FL	flight	DB	day bed	___	other: _____
___	other: _____				

Narrative: mud flat on west riverside.

Wetland #3

Table E-1
Fish and Wildlife Survey Form

Date (mm/dd/yyyy): 9/11/03 Page 1 of 1

Time: 1.45 PM Weather Conditions: Clear & Warm

Species Name	Number Obs.	Sight Code	Sign Code	Observer's Initials	Habitat Type / Location (approximate)
MUSKRAT	3 ?	FG	TR	PB	MILLET STAND WETLAND
DEER MOUSE	1	FG	TR	PB	" "
WATERFOWL	?	FG	TR	PB	
DEER (WHITE TAIL)		FE	TR	PB	SAGITTARIA LATIFOLIA
MUSSELS	THOUSAND +		TR.		IN SHALLOWS
MINNOWS	" "	FE		PB	" "

Instructions:
- Enter species common name in column 1 and number observed in column 2
- Select appropriate "sight" or "sign" codes from below and enter into designated boxes
- Enter initials of Observer
- Enter habitat where species was observed and approximate location in river
- Note exotic species if observed

Sight Codes:		Sign Codes:			
FG	foraging	SC	scat	CA	call
FE	feeding	SL	slide	NE	nest
RS	resting, perching	DHB	den, hut, burrow	TR	tracks
CA	calling	TR	tracks	FG	browse
FL	flight	DB	day bed	___	other: _____
___	other: _____				

Narrative this area is well used by waterfowl + aquatic ~~mats~~ mammals. Songbirds etc

Welland #4

Table E-1
Fish and Wildlife Survey Form

Date (mm/dd/yyyy): 9/11/03

Page 1 of 1

Time: 10:17 AM

Weather Conditions: SUNNY + WARM

GENERAL GPS 43.07.870 73.35.262

Species Name	Number Obs.	Sight Code	Sign Code	Observer's Initials	Habitat Type / Location (approximate)
BELTED KINGFISHER	2	FL	CA	PB	FRINGE WETLAND, EAST SHORE
ASSORTED MUSSELS	100 +	SIGHT	TR	PB	IN SHALLOW WATER
POND SNAIL	SIGHT			PB	" " "
MINNOWS	THOUSAND.+	FE			" " "
LD COTTING BEAVER				PB	
MUSKRAT		FE	DB	PB	PICKEREL WEED BED, FEED STATION
BULL FROG		FL			" " "
4 GREEN FROGS	4	FL		PB	" " "
GR. BLUE HERON	1	FE		PB	" " "

Instructions:

- Enter species common name in column 1 and number observed in column 2
- Select appropriate "sight" or "sign" codes from below and enter into designated boxes
- Enter initials of Observer
- Enter habitat where species was observed and approximate location in river
- Note exotic species if observed

Sight Codes:

FG	foraging
FE	feeding
RS	resting, perching
CA	calling
FL	flight
___	other: _____

Sign Codes:

SC	scat	CA	call
SL	slide	NE	nest
DHB	den, hut, burrow	TR	tracks
TR	tracks	FG	browse
DB	day bed	___	other: _____

Narrative these sightings were taken at north umberland upper Hudson River.

Appendix M

Statistical Analysis – Submerged Aquatic Vegetation

BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

General Electric Company
Hudson River PCBs Superfund Site
Habitat Assessment Report for Candidate Phase 1 Areas

Appendix M - Statistical Analysis - Submerged Aquatic Vegetation

No. of Quadrats	Variability of Stations	Standard Error of Quadrat Averages								
		Stn1	Stn2	Stn3	Stn4	Stn5	Stn6	Stn7	Stn8	Stn9
Biomass (log_{10})										
	0.123									
3	56%	0.177	0.120	0.096	0.067	0.172	0.124	0.114	0.123	0.223
4	67%	0.161	0.108	0.088	0.058	0.151	0.108	0.104	0.111	0.199
5	67%	0.149	0.097	0.082	0.054	0.138	0.100	0.094	0.101	0.180
6	67%	0.136	0.090	0.075	0.050	0.128	0.093	0.086	0.094	0.166
7	78%	0.128	0.084	0.070	0.047	0.118	0.086	0.080	0.087	0.155
8	89%	0.120	0.078	0.066	0.044	0.111	0.081	0.075		0.145
9	89%	0.114	0.074	0.062	0.042	0.105		0.071		0.137

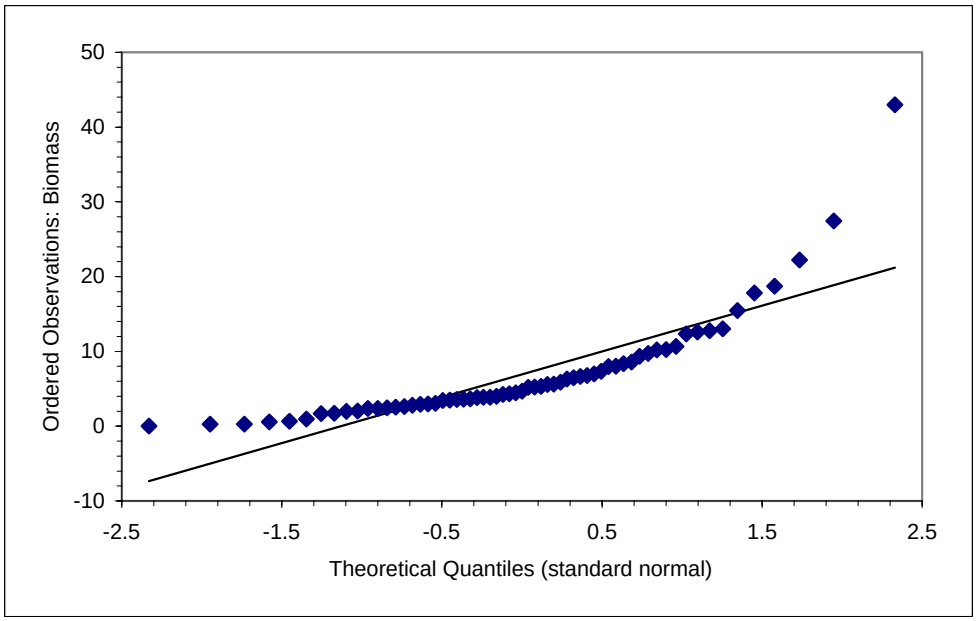
No. of Quadrats	Variability of Stations	Standard Error of Quadrat Averages								
		Stn1[a]	Stn2	Stn3	Stn4	Stn5	Stn6	Stn7	Stn8	Stn9
No. of Stems (sqrt)										
	0.760									
3	67%	1.50	0.772	0.457	0.529	0.938	0.338	0.379	0.366	0.745
4	78%	1.37	0.687	0.415	0.476	0.840	0.300	0.347	0.335	0.666
5	78%	1.31	0.637	0.375	0.449	0.769	0.273	0.319	0.304	0.602
6	89%	1.20	0.597	0.342	0.414	0.701	0.251	0.292	0.280	0.551
7	89%	1.14	0.557	0.320	0.382	0.651	0.232	0.277	0.259	0.514
8	89%	1.11	0.533	0.300	0.365	0.610	0.217	0.262		0.481
9	89%	1.05	0.505	0.284	0.348	0.575		0.247		0.455

No. of Quadrats	Variability of Stations	Standard Error of Quadrat Averages								
		Stn1	Stn2	Stn3	Stn4	Stn5	Stn6	Stn7	Stn8	Stn9
Percent Cover										
	11.7									
3	78%	11.7	12.1	11.0	8.54	8.46	9.29	7.56	9.72	12.3
4	100%	10.5	11.0	9.74	7.67	7.70	8.26	6.86	8.76	11.0
5	100%	9.57	9.93	8.90	7.45	6.90	7.38	6.17	7.85	10.1
6	100%	8.79	9.07	8.13	6.74	6.33	6.80	5.67	7.20	9.25
7	100%	8.13	8.44	7.74	6.30	5.89	6.33	5.32	6.70	8.59
8	100%	7.69	7.92	7.25	5.95	5.58	5.96	4.97		8.06
9	100%	7.26	7.47	6.87	5.64	5.27		4.71		7.60

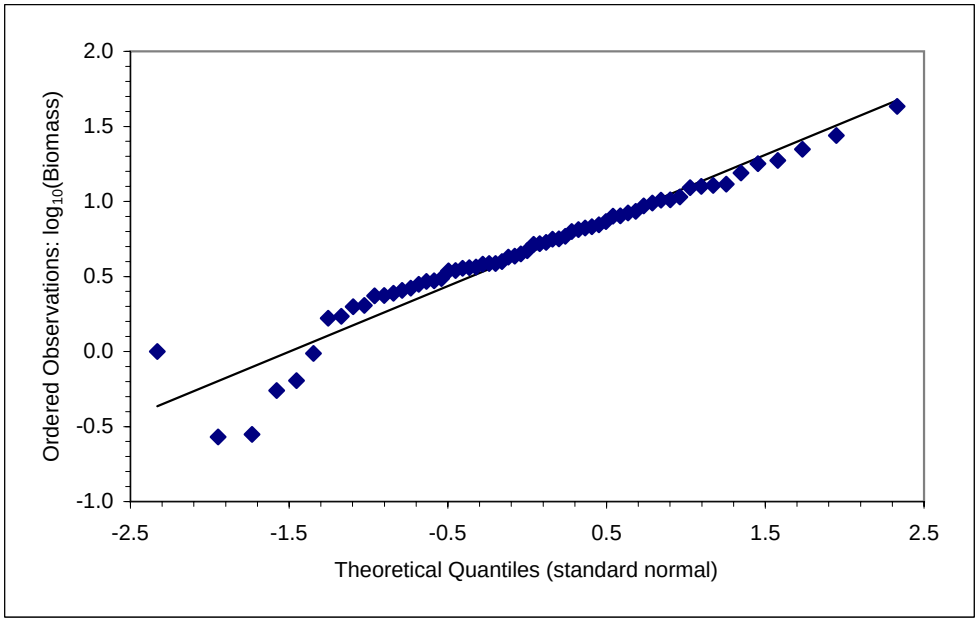
[a] - Stem density for one quadrat is 229 stems, whereas all other quadrats that range from 16 to 85. Variability estimates when excluding this quadrat fall below the station variability at 4 quadrats (0.739 standard error)

Appendix M - Statistical Analysis - Submerged Aquatic Vegetation

Biomass



N = 63, Mean = 6.9378, Sd = 7.1016
Slope = 6.1216, Intercept = 6.9378, Correlation, R = 0.8486
Lilliefors Statistic = 0.180, Critical Value(0.05) = 0.112
Data not Normal

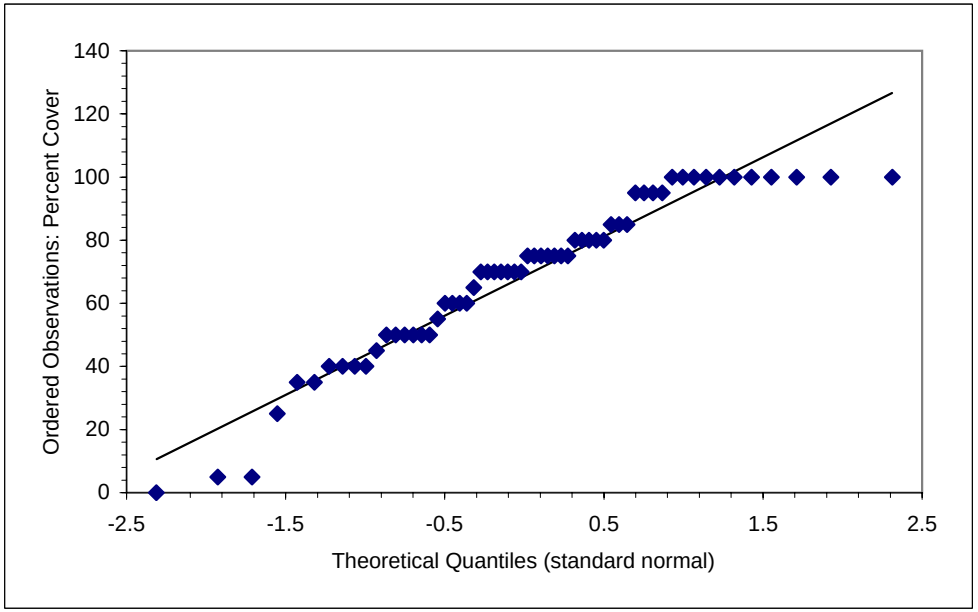


N = 63, Mean = 0.7755, Sd = 0.3289
Slope = 0.3323, Intercept = 0.7755, Correlation, R = 0.9947
Lilliefors Statistic = 0.064, Critical Value(0.05) = 0.112
Data[a] are Normal

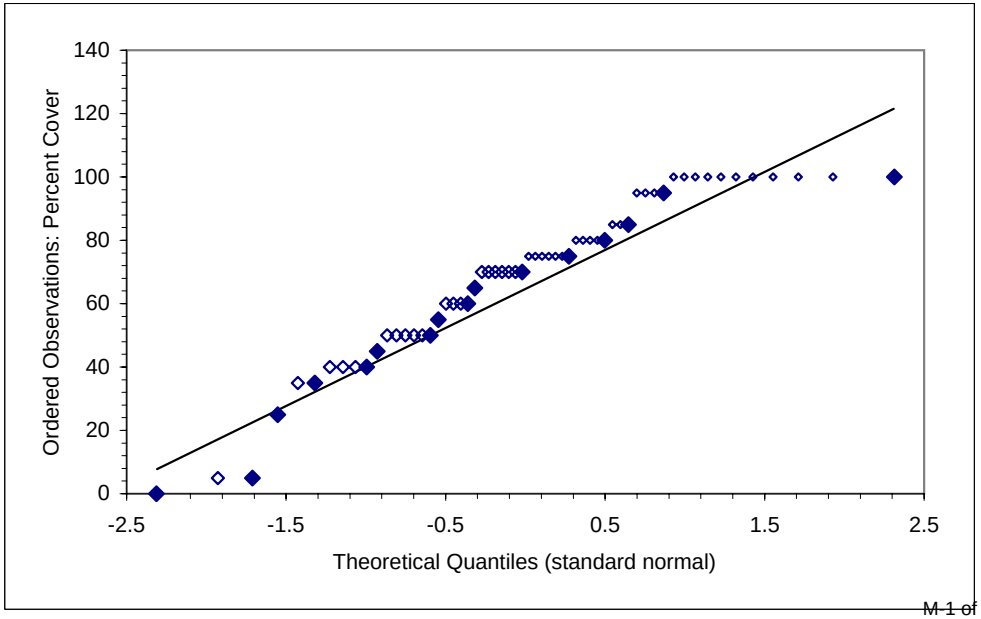
[a] - Data are $\log_{10}$(biomass)

Appendix M - Statistical Analysis - Submerged Aquatic Vegetation

Percent Cover



N = 60, Mean = 68.6667, Sd = 25.6255
Slope = 0.9795, Intercept = 0.0000, Correlation, R = 0.9637
Lilliefors Statistic = 0.137, Critical Value(0.05) = 0.114
Data not Normal

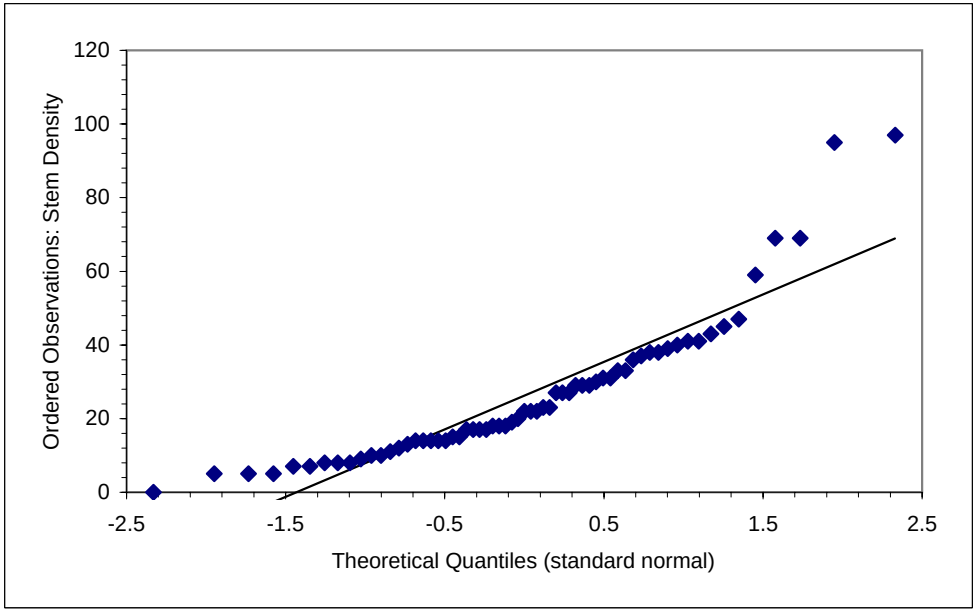


N = 16, Mean = 55.3125, Sd = 29.5222
Slope = 1.0343, Intercept = 0.0000, Correlation, R = 0.9899
Shapiro-Wilk Statistic = 0.970, Critical Value(0.05) = 0.887
Data[a] are Normal

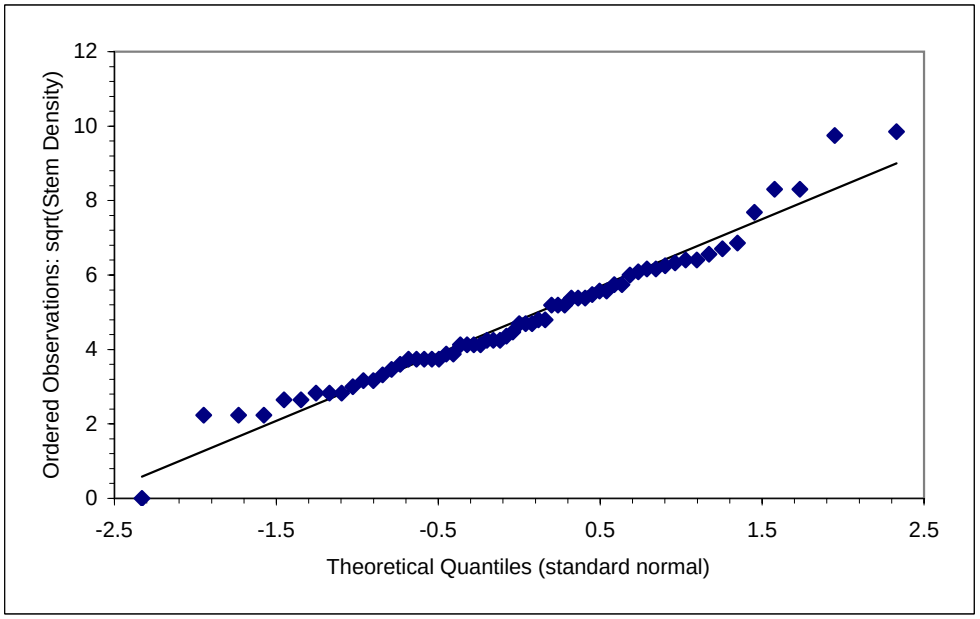
[a] - Data are Percent Cover without duplicates (solid diamonds on plot)

Appendix M - Statistical Analysis - Submerged Aquatic Vegetation

Stem Density



N = 63, Mean = 26.2063, Sd = 19.6372
Slope = 18.3128, Intercept = 26.2063, Correlation, R = 0.9181
Lilliefors Statistic = 0.136, Critical Value(0.05) = 0.112
Data not Normal



N = 63, Mean = 4.7938, Sd = 1.8105
Slope = 0.9975, Intercept = 0.0000, Correlation, R = 0.9821
Lilliefors Statistic = 0.080, Critical Value(0.05) = 0.112
Data[a] are Normal

[a] - Data are sqrt(stem density)