OUTLINE OF PROCEDURES FOR DATA COLLECTION
USING THE STANDARD DCR-DNH PLOT FORM
Virginia Dept. of Conservation and Recreation / Division of Natural Heritage (DCR-DNH)
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Overview

Quantitative data describing the composition and structure of vegetation are a critical component of the inventory, description, and classification of ecological communities. Ecologists at Virginia's DCR-DNH employ a standard data collection methodology that lists all vascular plant taxa within a determinate area (i.e. a plot or quadrat), along with information on each species' abundance, the vegetation structure, and various abiotic features in the sample area. These sampling protocols have been used by vegetation ecologists at DCR-DNH for over two decades, primarily as a tool to further a state-wide inventory of natural communities. To store and manage these data, DCR-DNH vegetation ecologists have developed a database that, as of this writing, contains data from over 4,400 sampling locations across the state. Standard protocols for data collection and management facilitate cross-jurisdictional analysis and classification by ensuring that our data are optimally compatible with those collected by other vegetation scientists in the region.

This document outlines the methods we use to collect data from inventory plots for the purposes of vegetation classification and description. The standard inventory protocol allows for a flexible plot size and layout, incorporates a single measure of abundance for all taxa, and recognizes the need to complement compositional data with detailed information on the vertical structure of vegetation in order to fully characterize vegetation. In addition, the protocol is sufficiently flexible to accommodate, with some modification, varying levels of detail and intended uses, such as rapid ecological assessment or monitoring vegetation change. However, description of these methods is beyond the scope of this document. Also not described in this document are other, more intensive sampling protocols, used by DNH Ecologists. This more intensive vegetation sampling protocol uses permanently marked plots, with nested subplots, that are designed to be resurveyed over time to detect change in vegetation structure and composition.

Site and environmental data collected at each plot location permit characterization of the abiotic conditions and examination of vegetation-environmental relationships. Information about the implementation of the sampling protocol at each site is essential for quality control, placing the plot in a local and regional context, and for the possibility of future relocation and re-measurement. Although the requirements for site and environmental data will vary among projects, basic standards for the collection of these data have been developed and are included on the data collection form.

Sampling Site Selection and Plot Layout

Subjective plot placement is often used in studies where the aim is vegetation description and classification, because it is a more efficient means of sampling than random sampling, particularly in fragmented or disturbed landscapes. It also allows for better characterization of rare or minor plant community types, which might otherwise be under sampled. Capturing representative examples of the full range of undisturbed, native vegetation types requires the intentional selection of sample sites, deliberately placing them away from field edges, clearcuts, roadsides, and other anthropogenically disturbed areas. In selecting a sampling site, it is important to place the plot in vegetation that is floristically and structurally homogeneous, avoiding ecotones or transitions in vegetation and habitat conditions. Additionally, the plot size must be adequate to serve as a sample of the vegetation type (i.e., capture adequate representation of species composition and vegetation layering). DCR-DNH protocols allow for varying plot size and layout to accommodate differences in vegetation structure and pattern. A 400 m^2 quadrat (square or rectangular) is standard for forest and woodland vegetation; 100 m^2 is standard for shrubland and herbaceous vegetation. Standard configurations of 20 x 20 m and 10 x 10 m may be adjusted (*e.g.*, 16 x 25, 10 x 40, 5 x 20 m) to accommodate special site conditions and narrow habitats such as stream-bottoms and ridge crests. The 400 m^2 size is sufficient for obtaining a representative sample of most Virginia forest vegetation. However, in rare cases where tree composition is extraordinarily diverse or consists of large-crowned individuals, it may be necessary to sample an 800 m^2 (20 x 40 m) or 1000 m^2 (20 x 50 m) quadrat in order to capture an adequate sample. Small-patch vegetation types occurring as spatial mosaics (e.g., barren / woodland complexes or physiognomically variable draw-down zones on pond or river shores)

pose special problems in vegetation sampling, particularly in determining where to place a sample and what exactly to capture. As a rule, if 100 m^2 plots cannot fit comfortably in the homogeneous zones of a given mosaic, then a larger plot should be used to sample the larger mosaic. If 100 m^2 plots can fit comfortably in the zones, then these components should be sampled separately and notes made of their occurrence together.

When laying out plots on slopes or ridges, one plot dimension should be parallel to the slope, *i.e.*, with its line bearing equal to slope aspect. Use a compass, measuring tapes (30 m and 50 m are optimal), and flagging to mark the full boundary of the plot. If plots are to be permanently monumented, use numbered tree tags in combination with aluminum or fiberglass conduit. To aid in estimating cover classes, tapes may be run down the center of the plot to mark the centerline or used to divide the plot into quarters.

Data Collection Form:
The following provides general instructions for completing the DCR-DNH data collection form. See also Appendix B, which contains an example of a completed form.

Page 1: Plot Documentation
General Information
Record the alphanumeric code for the plot, the project with which it is associated (if any), date of sampling, and the full names of surveyors participating in the data collection. Record the dimensions and size of the plot.

Plot Location
If the plot is located within a managed area such as a park or National Forest, list the full name of the area. Record the name of the survey site, USGS quadrangle, county, state, and physiographic province within which the plot is located.

Plot Documentation
Photographs of a plot are useful for recording the general aspect of the sample site, and serve as a permanent record of conditions at the time of the data collection. Take at least one representative photograph and record identifying digital file numbers or film frame numbers of images taken. The subject of the photo can also be described (e.g. “Looking down centerline on a bearing of 180 degrees” or “general plot aspect”)

GPS Data
Use a global positioning system (GPS) unit to determine plot coordinates, and record UTM zone, datum, GPS file name, estimated horizontal accuracy, and number of positions averaged, and receiver status. It is a good practice to write down coordinates in the field, in case something happens with your GPS file. If a GPS unit is not available, estimate plot location, as precisely as possible, on a USGS quadrangle map.

Estimated Stand Size
In order to provide information about the relative size of the stand being sampled, check the most appropriate category on the form. Notes can also be made about the actual or estimated size of the stand and its pattern on the landscape.

Page 1: Site Characteristics

Elevation
Elevation can be recorded from an estimated location on a topographic map, or more accurately by using a calibrated, barometric altimeter or plotting GPS coordinates on a topographic map. Check the appropriate method and record the elevation.

Surface Substrate
Estimate the surface cover (in percentages) of various abiotic substrates listed on the data sheet such that they sum to 100%; ignore the area covered by tree bases. The percent cover of bryophytes and lichens is in addition to the 100% cover by abiotic substrates.

Slope

Record slope inclination in degrees from plot center using a clinometer. In cases where slope is variable within the plot, take multiple measurements and average the results. If a clinometer is not available, estimate slope using the percentage classes on the form.

Slope Shape

Estimate slope curvature in both horizontal and vertical directions (i.e., parallel to each plot axis). To do this accurately requires that one consider an area somewhat larger than the plot itself. If curvature is variable, i.e., both convex and concave along parts of the same axis, record the value as "straight." In addition, if plot is located in a wetland with strong hummock-and-hollow microtopography, indicate what percentages of the plot area are on hummocks and in hollows. If the plot is located on a cliff or boulderfield with numerous, irregular, exposed rocks, check the field indicating "irregular craggy/boundary microtopography."

Aspect

Record aspect in degrees; measuring it from the plot center with a compass. If slope inclination is less than 5 degrees, record aspect as "flat." If the plot contains two or more slopes with different aspect, record aspect as "variable." Indicate if the compass used was corrected for declination by checking “corrected” or “magnetic” at the bottom of this section.

Landform

Check the appropriate category for the plot location. Landform is useful for characterizing the environmental context of a vegetation sample. It is not used in analysis. Definitions (the usual physiographic regions in which the terms are applied are listed in parentheses):

Ridge / Interfluve – the elevated summit between two drainage ways that sheds water to them (mountains).

Saddle / Gap – a low point on a ridgeline, generally a divide between the heads of streams flowing in the opposite directions (mountains).

Side Slope – a slope forming the flank of an incised valley (mountains).

Slope Bench / Ledge / Step – a narrow, more or less level area on a slope bordered by steeper terrain both upslope and downslope (mountains).

Fan Piedmont – an erosional, foot-slope landscape mantled with colluvial debris from adjacent high ridges and alluvial fan material deposited by streams (mountains).

Cove – in the mountains, a concave landform formed by downcutting of a headwater stream or streams; a hollow (mountains).

Cliff / Escarpment / Face – a continuous and steep, rocky slope or rock outcrop breaking the continuity of more gently sloping land surfaces and produced by erosion or faulting. Usually applied to cliffs produced by differential erosion or stream incision (mountains, Piedmont, inner Coastal Plain).

Bedrock Outcrop – an exposed surface of bedrock (mountains, Piedmont).

Boulderfield / Talus / Debris Slide – a steep deposit of unconsolidated boulders, stones, or other rock fragments detached from outcrops and transported downslope by water and gravity (mountains, Piedmont).

Hill / Knob / Monadnock – a more or less isolated ridge or range of ridges, resulting from erosion of the surrounding terrain and usually underlain by relatively resistant rocks (Piedmont, mountain valleys).

Rolling / Dissected Upland – a gently sloping to somewhat hilly or stream-incised landscape; the characteristic landform of the Piedmont Plateau in Virginia (mountain valleys, Piedmont, inner Coastal Plain).

Undulating / Flat Plain – an extensive, flat or nearly flat lowland area with few or no prominent hills or valleys; may constitute an upland, a wetland, or both; in Virginia, most applicable to large terraces of the Coastal Plain (Coastal Plain).

Dune – a hill or ridge of sand formed by eolian (wind-driven) or sometimes alluvial processes (outer Coastal Plain).

Beach / Overwash Flat – the sandy shore of the ocean or an estuary / a sand flat situated behind a beach or breached foredune and subject to flooding by high spring tides and storm surges. Substrates of both habitats consist of unconsolidated sand and shell sediments that are constantly shifted by winds and floods, while low relief and constant salt spray maintains generally moist conditions (outer Coastal Plain).

Interdune Flat / Interdune Swale – a level area, depression, or hollow between secondary dunes that is seasonally or permanently saturated by a perched water table and shallow or temporary flooding. These habitats are predominantly influenced by fresh water from rainstorms, but may be periodically flooded by salt water from ocean storm surges (outer Coastal Plain).

Tidal Flat – a level muddy surface bordering an estuary, alternately submerged and exposed to the air by changing tidal levels (Coastal Plain).

Ravine – A small stream valley, generally narrow, steep-sided, and V-shaped in cross section (mountains, Piedmont, Coastal Plain).

Seep / Swale / Non-Alluvial Bottom – a small area of groundwater discharge, either non-forested or shaded by trees rooted in adjacent, upland habitats / a slight depression in a generally level or undulating landscape / a headwaters stream bottom with indistinct drainage channels, lacking active alluvial deposition and having a groundwater-controlled hydrology (mountains, Piedmont, Coastal Plain).

Alluvial Flat / Alluvial Terrace / Floodplain – a nearly level plain that borders a stream, has unconsolidated water-deposited soils, and is usually subject to inundation (non-tidal) under flood-stage conditions (mountains, Piedmont, Coastal Plain).

Floodplain Levee – a low ridge or embankment of sand and coarse silt, built up by a stream on its floodplain and located adjacent to its channel (mountains, Piedmont, Coastal Plain).

Channel Shelf / Stream Margin / Bar – the terrace (alluvial or bedrock) and depositional features (sand, gravel, or cobble) formed by the current level of a stream channel (mountains, Piedmont, Coastal Plain).

Backswamp / Slough / Oxbow –depressed areas of a floodplain between the elevated levee bordering a channel and a valley side or terrace; a backswamp is a broad, slightly depressed bottom; a slough is discrete, elongate depression; an oxbow is a long, curved or sinuous depression, usually representing an abandoned channel of the stream (mountains, Piedmont, Coastal Plain).

Sag Pond / Basin – a natural pond or depression wetland lacking an outlet and formed from solution or sagging and collapse of underlying geological strata (mountains, Piedmont, Coastal Plain).

OTHER - additional landforms may be added. Please specify and define.

Topographic Position

Indicate the appropriate topographic position of the plot relative to the local relief, i.e., on a scale running from the nearest stream bottom to the nearest ridge crest. This may be more accurately done by assessing the plot location on a USGS topographic map. All floodplains, tidal flats, and

Coastal Plain terraces and uplands with very low relief should be recorded as "plain/level/bottom." In very low-relief landscapes, a plot can occupy the full length of a very short slope along an incised water body; in these cases, record topographic position as "middle slope." Use "basin/depression" only for discrete isolated basin wetlands, ponds, pools, and floodplains sloughs.

Evidence of Disturbance

Record any evidence of past disturbance (old stumps, fire scars, charcoal in soil, plant diseases, insect pathogens, etc.) observed in or around the plot. Check off appropriate categories and provide comments as needed.

Cowardin System

Check to appropriate category on the form.

Soil Drainage Class

Subjectively estimate the appropriate soil drainage class for the plot habitat. These are defined as follows:

> Very poorly drained – Free water remains at or within 0.3 m of the surface for most of the year. Soils usually are very strongly gleyed and have a mucky or peaty surface horizon. Subsurface horizons are of low chroma with yellowish to bluish hues. Mottling may be present but at depth in the profile.
>
> Poorly drained – Soil moisture in excess of field capacity remains in all horizons for a large part of the year. Soils are usually very strongly gleyed. Except in high-chroma parent materials, the B, if present, and upper C horizons usually have matrix colors of low chroma. Faint mottling may occur throughout.
>
> Somewhat poorly drained – Soil moisture in excess of field capacity remains in subsurface horizons for moderately long periods during the year. Soils are commonly mottled in the B and C horizons; the Ae horizon, if present, may be mottled. The matrix generally has lower chroma than in well-drained soils derived from similar parent material.
>
> Moderately well drained – Soil moisture in excess of field capacity remains for a small but significant period of the year. Soils are commonly mottled (chroma < 2) in the lower B and C horizons or below a depth of 0.6 m. The Ae horizon, if present, may be faintly mottled in fine-textured soils and in medium-textured soils that have a slowly permeable layer below the solum. In grassland soils the B and C horizons may be only faintly mottled and the A horizon may be relatively thick and dark.
>
> Well drained – Soil moisture capacity does not normally exceed field capacity in any horizon (except possibly C) for a significant part of the year. Soils are usually free from mottling in the upper 1 m, but may be mottled below this depth. B horizons, if present, are reddish, brownish or yellowish.
>
> Rapidly drained – Soil moisture content seldom exceeds field capacity in any horizon except immediately after water addition. Soils are free from any evidence of gleying throughout the profile. Rapidly drained soils are commonly coarse-textured or soils on steep slopes.

Inundation

Estimate the appropriate class of inundation based on evidence in the field. This may be difficult, but noting whether or not there are water marks on trees or other evidence of seasonal flooding can help. For floodplain habitats subject to brief periods of overland flooding during high stream flows, record inundation as "infrequently."

Soil Moisture Regime

Estimate the appropriate class of soil moisture based on the definitions provided on the field form. Check only one class in the range from very xeric to hydric. If the habitat is an upland or rock outcrop with periodic ephemeral seepage or subsurface groundwater in part of the plot, also check this category.

Hydrologic Regime

Estimate the appropriate class of hydrologic regime. Definitions of wetland regimes from Cowardin (1979) are:

Tidal (estuarine sites):

IRREGULARLY EXPOSED – The land surface is exposed by tides less often than daily. Area encompasses the range from height of mean low tide to height of extreme low spring tide.

REGULARLY FLOODED – Tidal water alternately floods and exposes the land surface at least once daily, caused by lunar attraction. Area encompasses the range from height of mean low tide to height of mean high tide.

IRREGULARLY FLOODED – Tidal water floods the land surface less often than daily but at least once a year, due to extreme high spring tide. Area encompasses the range from height of mean high tide to maximum extent of tide plus splash zone.

WIND TIDAL – A special type of irregular flooding in which wind tidal influence clearly or likely prevails. Wind tidally flooded is not necessarily an exclusive hydrologic modifier.

SUBTIDAL – Tidal water covers the land surface at all times of the year in all years. This modifier applies only to permanently flooded habitats that are irregularly flooded by fresh tidal water.

Non-tidal (palustrine, lacustrine, riparian sites):

PERMANENTLY FLOODED – Water covers the land surface at all times of the year in all years.

SEMIPERMANENTLY FLOODED – Surface water persists at least throughout the growing season in most years. The land surface is normally saturated when water level drops below the soil surface.

SEASONALLY FLOODED – Surface water is present for extended periods, especially early in the growing season, but is absent by the end of the growing season in most years. When surface water is absent, the water table is often near the land surface, but is highly variable after flooding ceases, extending from saturated to a water table well below the ground surface.

INTERMITTENTLY FLOODED – The substrate is usually exposed, but surface water can be present for variable periods without detectable seasonal periodicity. Inundation is not predictable and is dependent upon highly localized precipitation events. Long periods of time may elapse between inundation events. This modifier can apply to both wetland and non-wetland habitats.

TEMPORARILY FLOODED – Surface water is present for brief periods during the growing season, but the water table usually lies well below the soil surface for most of the season. Vegetation is characterized by both upland and wetland plants. This regime often characterizes floodplain wetlands.

SATURATED – The substrate is saturated at the surface for extended periods during the growing season, but surface water is seldom present.

Salinity / Halinity:

For tidal sites, estimate the salinity class and check if based on a refractometer measurement.

Soil Sample and Description

At a minimum, collect about one to two cups of soil from the A-horizon after carefully removing surface duff and humus (optional, for laboratory analysis). If possible collect soil from several locations within the plot and mix into a composite sample. Depth, character, and color of surficial duff and humus (O) should be recorded, and the A-horizon color, texture, depth and structure should be field-examined and recorded. A Munsell soil color chart can be helpful, but is not required. The color, texture, and depth of other horizons the profile may also be described as time permits. See Appendix A for a simplified field key to soil texture. Indicate on form whether soil sample was a single or composite sample, and if the latter, how many samples were mixed. Also identify surficial rock types present in the plot, if known.

Page 2: Other Information

Plot Configuration, Map Sketch, and directions for Relocating Plot
Sketch the plot configuration following the instructions on the field form (optional).

Qualitative Assessment and Notes
Write a brief description of the plot and vegetation, following the instructions provided on the form.

Vegetation Structure and Physiognomy
In the first table, circle the appropriate categories of stand physiognomy, dominant leaf phenology, and leaf type for the overall stand. Fill in the second table of strata structure with the total % vegetation cover and maximum height in meters of each stratum listed. Canopy and stratum height can be determined efficiently by selecting what is believed to be the tallest tree in the plot and each stratum, and measuring its height with a clinometer, caliper device, or laser hypsometer. With experience, it will be possible to readily estimate the height of lower strata. Circle the appropriate leaf type/growth form and phenology/growth form categories for the strata. NL = needleleaf, BL = broadleaf, D = decidous; MD = mixed-decidious; E = evergreen; ME = mixed-evergreen; Pt = pteridophytes (ferns); F = forbs; Gr = graminoid; W = woody seedlings; Er = ericads, Mx = mixed, Per = perennial, Ann = annual, Dw = deciduous woody, Ew = evergreen woody, B = bryophyte; LIC = lichens; MIXED = a mix of lichens and bryophytes.

Provisional Community Name
Compare sampled vegetation to descriptions of Ecological Community Groups on the Natural Communities of Virginia website (http://www.dcr.virginia.gov/natural_heritage/ncintro.shtml) and record provisional classification of plot (optional)

Page 3: Woody Stem Counts and Compositional Data
Woody Stem Counts
Using a biltmore stick, tally woody stems $\geq$ 2.5 cm and < 40 cm in dbh by diameter classes: 2.5 to 5 cm, 5 to 10 cm, 10 to 15 cm, 15 to 20 cm, 20 to 25 cm, 25 to 30 cm, 30 to 35 cm, 35 to 40 cm. Measure trees $\geq$ 40 cm dbh to the nearest cm with a dbh tape. This procedure can be optional if time or the need for structural data is limited. The data can be used later to generate standard forestry statistics for density, basal area, and importance value for each species.

Tree Age Data
Record the DBH of any trees from which an increment core was collected to estimate age (optional).

Pages 3-4. Species Composition and Cover Class by Stratum
In this table, list all vascular plant taxa present in the plot and record cover using the following cover classes:

1 = trace, < 0.1%
2 = 0.1 to 1%
3 = 1 to 2%
4 = 2 to 5%
5 = 5 to 10%
6 = 10 to 25%
7 = 25 to 50%
8 = 50 to 75%
9 = 75 to 100%

Bear in mind that 1% cover in a 400 m2 plot is 4 m2 (2 x 2 m) and in a 100 m2 plot is one m2. For plants with higher cover, it can be useful to progressively consider whether the species covers three-quarters (75%) of the plot, half (50%) of the plot, a quarter (25%) of the plot, and so forth, in order to arrive at the best estimate. Another general guideline is that, in most Virginia forests, an individual canopy tree with an average crown typically has a cover of "5," while a tree with a large crown typically has a cover of "6."

Estimate the cover over the entire plot area of all taxa present in the "TC" (total cover) column. Also record the cover of woody taxa (including seedlings) in each of six height strata when

present. Determination of which stratum an individual plant belongs in is determined by its maximum height. The six strata are:

Herb layer: includes all herbaceous and woody plants < 0.5 m tall
Shrub layer: woody plants (including small trees) 0.5 to 6 m tall
6 m tree layer: trees and very large shrubs 6 to 10 m tall
10 m tree layer: trees 10 to 20 m tall
20 m tree layer: trees 20 to 35 m tall
35 m tree layer: trees ≥ 35 m tall

All herbaceous plants, regardless of their height are recorded in the Herb layer. Estimate the cover of each herbaceous taxon present in the plot using the cover class scale above.

Species not not rooted within the plot boundaries but overhanging, or present outside the plot in the same habitat / community may be recorded and given a cover value of "1." In these cases, check the box in the "Out" column at the far left of the table.

Species with questionable or uncertain identifications should be flagged by checking the box in the "ID" column on the left side of the table. If specimens are collected for later identification, check the box or write a collection number in the "Coll./#" column at the far right.

You may elect to record cover of Non-vascular (i.e., bryophyte and lichen) species, in which case the box in the "N" column should be checked.

After sampling is completed, record the total species richness, i.e., the total number of taxa in the plot. Exclude species rooted outside the plot boundary from the calculation.

Please refer to Appendix B for an example of a completed field form.

APPENDIX A: Field Key to Soil Texture

The following simplified soil key was adapted from Brewer,R. and M.T. McCann. 1982. Laboratory and Field Methods in Ecology, Saunders College Publishing, Philadelphia, PA

APPENDIX A

Simplified Key to Soil Texture (Brewer and McCann 1982)

A1 Soil does not remain in a ball when squeezed …… **sand**
A2 Soil remains in a ball when squeezed ……. B

- **B1** Squeeze ball between thumb and forefinger, attempting to make ribbon to push up over finger. Soil makes no ribbon …… **loamy sand**
- **B2** Soil makes a ribbon …….. C
  - **C1** Ribbon extends < 1 in before breaking …… D
  - **C2** Ribbon extends ≥ 1 in before breaking …… E
    - **D1** Add excess water to small amount of soil. Soil feels at least slightly gritty…….. **loam** OR **sandy loam**
    - **D2** Soil feels smooth ……. **silt loam**
      - **E1** Soil makes a ribbon that breaks when 1-2 in long and cracks when bent into a ring ……. F
      - **E2** Soil makes a ribbon ≥ 2 in long and doesn't crack when bent into a ring ……... G
        - **F1** Add excess water to small amount of soil. Soil feels at least slightly gritty …….. **sandy clay loam** OR **clay loam**
        - **F2** Soil feels smooth …….. **silty clay loam** OR **silt**
          - **G1** Add excess water to small amount of soil. Soil feels at least slightly gritty …**sandy clay** OR **clay**
          - **G2** Soil feels smooth ……. **silty clay**

APPENDIX B: Example of a Completed DCR-DNH Vegetation Plot Data Collection Form

GENERAL INFORMATION
PLOT: BESP004
Project (if applicable): STATE PARKS INVENTORY
Date: 4/27/09
Surveyors: GARY FLEMING, KAREN PATTERSON, IRENE FRENTZ

Plot dimensions: 16 by 25 m
Sample area 400 sq. m

PLOT DOCUMENTATION
Photographer: FLEMING ☐ NO photos taken
Camera NIKON D200
File / frame #s: 007-009
Description of image(s): VIEW FROM SW CORNER

PLOT LOCATION
Managed Area (if applicable): POWHATAN STATE PARK
Survey Site: BEAUMONT Quad: GOOCHLAND
County: POWHATAN State: VA PhysProv: SP

GPS DATA
GPS Unit: GARMIN RINO 350
GPS point or file name: 007
est accuracy: 3.0 (m)/ft # of positions averaged: 300
Reciever status: 2D (3D) / 2D WAAS / 3D WAAS
Field Coordinates:
UTM X 241,743 E Y 4,175,117 N
LAT 37°41'12.9" LONG 77°55'43.5"
Marked est. location on toposheet ✓ yes

Estimated stand size
extensive (> 100 ac ; 40 ha) >1000 x plot)
large (> 10 < 100 ac; 4 - 40 ha; >100 x plot)
(small) (>1 < 10 ac ; 0.4 - 4 ha); >10-100 x plot)
very small (< 1 ac ; < 0.4 ha) <10 x plot)
Unknown

Notes on stand size:
LIMITED TO LOWER & MID SLOPES OF RAVINE SYSTEM

SITE CHARACTERISTICS
Elevation 61 m/ft via GPS ✓ map __ altimeter __

Surface Substrate (% cover)
TOTAL = 100% (excl. nonvascular plants)
__ %bedrock 98 %litter / organic matter __ %other (describe)
__ %boulders/stones 2 %decaying wood
__ %gravel/cobbles __ %mineral soil / sand
__ %water 21 % nonvascular

Slope (degrees) 14
single measure. ✓ or: avg of __

☐ 0-3% (level or nearly so)
☐ 3-8% (gentle/undulating)
☐ 8-16% (sloping/rolling)
☐ 16-30% (moderate/hilly)
☐ 30-65% (steep)
☐ 65-75% (very steep)
☐ 75+% (extremely steep)

Slope Shape (V w/ slope)

VERTICALLY	HORIZONTALLY
C concave	C concave
(X) convex	(X) convex
S straight	S straight

☐ hummock (___% of plot) and hollow (___%) microtopography
hummock height (cm) ___
☐ check if irregular craggy/ or bouldery microtopography

Slope Aspect (N = 0 degrees): 20
single measure ✓
avg. of __

F (flat) (N) 338-22 ° NE 23-67 °
V (variable) E 68-112 ° SE 113-157 °
S 158-202 ° SW 203-247 °
W 248-292 ° NW 293-337 °
compass: magnetic (corrected)

Landform
☐ ridge / interfluve
☐ saddle / gap
☐ side slope
☐ slope bench / ledge / step
☐ fan piedmont
☐ cove
☐ cliff / escarpment / face
☐ bedrock outcrop
☐ boulderfield / talus / debris slide
☐ hill / knob / monadnock
☐ rolling / dissected upland
☐ OTHER:
☐ undulating / flat plain
☐ dune
☐ beach / overwash flat
☐ interdune flat / interdune swale
☐ tidal flat
☑ ravine
☐ seep / swale / non-alluvial bottom
☐ alluvial flat / alluvial terrace / floodplain
☐ floodplain levee
☐ channel shelf / stream margin / bar
☐ backswamp / slough / oxbow
☐ sag pond / basin

Topographic Position
☐ crest / interfluve
☐ upper slope
☐ middle slope
☑ lower slope
☐ toe slope
☐ plain/level/bottom
☐ basin/depression

Evidence of Disturbance
☐ ditching/hydrologic alternation
☐ dogwood anthracnose ☐ oak decline
☑ exotic plants ☐ hemlock adelgid
☐ trails/roads ☐ gypsy moth
☐ clearing ☐ spruce decline
☑ grazing/browsing ☐ fire
☑ wind/ice damage ☐ erosion
☐ logging
☐ Other

Disturbance Comments: MODERATE COVER OF LONICERA JAPONICA IN PARTS OF PLOT

Cowardin System: (Upland) Palustrine Estuarine Riverine Lacustrine

Soil Drainage Class
☐ very poorly drained
☐ poorly drained
☐ somewhat poorly drained
☐ moderately well drained
☑ well drained
☐ rapidly drained

Inundation
☑ never
☐ infrequently
☐ regularly; for <6 mos.
☐ regularly; for >6 mos.
☐ always submerged by shallow water (<30cm)
☐ always submerged by deep water (>30cm)
☐ unknown

Soil Moisture Regime
☐ - very xeric (moist for neglig. time after ppt)
☐ - xeric (moist for brief time)
☐ - somewhat xeric (moist for short time)
☐ - submesic (moist for moderately short time)
☑ - mesic (moist for significant time)
☐ - subhygric (wet for signicant part of growing season; mottles <20cm)
☐ - hygric (wet for most of growing season; permanent seepage/mottling)
☐ - subhydric (water table at or near surface for most of the year)
☐ - hydric (water table at or above surface year round)

Evaluate separately from above
☐ - ephemeral seepage/subsurface water present locally in plot (non-wetland habitats)

Hydrologic Regime
✓ Terrestrial (i.e. not a wetland)
Tidal
☐ Irregularly exposed (< daily)
☐ Regularly flooded (>=daily)
☐ Irregularly flooded (< daily, but >=once/yr)
☐ Wind tidally flooded
☐ Subtidal (permanently flooded)
Non-Tidal
☐ Permanently flooded
☐ Semipermanently flooded
☐ Seasonally flooded
☐ Intermittently flooded
☐ Temporarily flooded
☐ Saturated
Salinity/Halinity
☐ Saltwater
☐ Brackish
☐ Oligohaline
☐ Freshwater
Refractometer Measurement: __

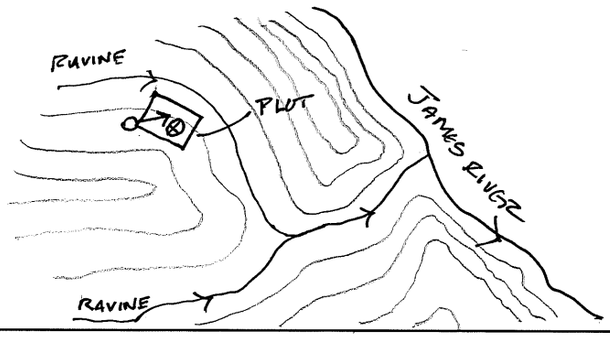
Soil Sample: Single Sample __ Composite Sample ✓ No. of samples mixed 2 Field measured pH __
Rock Types Present: NONE PRESENT AT SURFACE; MAPPED AS PORPHYROBLASTIC GARNET-BIOTITE GNEISS

Soil Profile Description

Horizon/ Depth(cm)		Description (color, texture, structure, consistency)
0-	3	LEAF LITTER
3	4	HUMUS, FINE ROOTS
	4+	MEDIUM-BROWN CLAY LOAM W/SMALL STONES

Other Soil Notes:
SOIL EVIDENTLY COLLUVIAL & DEEP

Sketch plot configuration, indicate the plot architecture, points where GPS positions were collected, locations of permanent stakes or markers (if any), locations and bearings of photopoints, and directions and distances to landmarks (include species and dbh of witness trees). Use the symbols in the key below for GPS points, photos, and permanent markers. Also provide complete directions for relocating permanently marked plots, accompanied if possible by a sketch showing plot orientation and depicting roads, trails, etc., as well as distinctive features of the vegetation. If necessary, attach copy of USGS topographic quad map indicating location of plot.



⊗	GPS position
○→	Photo # and direction
●	Permanent Marker

QUALITATIVE ASSESSMENT AND NOTES

Write a brief word picture of community. Describe the representativeness of the plot to the vegetation type being sampled and any variation within the occurrence in terms of vegetation structure, floristics, and environment. Note vertical stratification or horizontal zonation patterns. Describe dominant and characteristic species and inclusion communities (if present). If community occurs as a mosaic describe spatial distribution and associated community types. Include landscape context information (adjacent communities). Describe any special or unusual features of the vegetation or habitat. If possible, note the origin and (for moderately even-aged forests) approximate age of the stand. Record the presence at the site of species not sampled in the plot. Note, where appropriate, the approximate distance and direction to proximate water sources, such as river channels, perennial streams, intermittent streams, and seepage or runoff areas. For riparian and other wetland sites note the height of primary and secondary water marks and/or the presence of fluvial features.

PLOT LOCATED IN A RELATIVELY SMALL STAND OF RICH UPLAND FOREST THAT OCCUPIES A BRANCHED RAVINE SYSTEM ON THE BLUFFS ABOVE THE JAMES RIVER. BLOW-DOWNS FROM HURRICANE ISABEL (2003) CONTRIBUTED A NUMBER OF CANOPY GAPS IN AND AROUND THE PLOT. THE STAND IS A MEDIUM-AGED MIXED FOREST OF LIRIODENDRON TULIPIFERA, FAGUS GRANDIFOLIA, CARYA SPP., LIQUIDAMBAR STYRACIFLUA, AND FRAXINUS AMERICANA, WITH ACER RUBRUM AND ULMUS RUBRA MOSTLY IN THE UNDERSTORY. STAND WAS LOGGED PROBABLY ~80 YEARS AGO, LACKS ANY RECRUITMENT OF LIRIODENDRON AND OAKS, AND HAS ABUNDANT RECRUITMENT OF FAGUS IN ALL SUB-CANOPY STRATA. THE HERB LAYER IS LUSH WITH DOMINANCE PATCHES OF ASARUM CANADENSE, PODOPHYLLUM PELTATUM, TIARELLA CORDIFOLIA VAR. COLLINA, PACKERA OBOVATA, AND OTHER NUTRIENT-DEMANDING FORBS.

VEGETATION STRUCTURE AND PHYSIOGNOMY

PHYSIOGNOMY (entire stand)	**DOMINANT LEAF PHENOLOGY (entire stand)**	**LEAF TYPE (dominant stratum)**
(Forest)	Deciduous (< 25% evergreen)	(Broadleaf)
Woodland	Mixed deciduous (25-49% evergreen)	Needleleaf
Shrubland / Sparse Shrubland	Mixed evergreen (25-49% deciduous)	Mixed
Herbaceous with sparse tree layer	Evergreen (< 25% deciduous)	Ericad
Herbaceous with sparse shrub layer	Perennial graminoid	Broadleaf Herbaceous
Herbaceous	Perennial forb	Graminoid
Nonvascular: Bryophyte Lichen	Perennial mixed	Pteridophyte
Sparsely Vegetated	Annual herbaceous	Bryophyte
	Not applicable	Lichen

Stratum	**all trees**	**T>35**	**T20**	**T10**	**T6**	**S**	**H**	**N**
cover (%)	75	/	70	/	15	40	75	<1
height (m)	34					5	0.5	
Leaf type / Growth form	NL (BL) mixed					NL (BL) mixed	Gr (F) W Er Pt (B) Mx LIC MIXED	
Phenology / Growth habit	(D) E MD ME					(D) E MD ME	(Per) Ann Dw Ew	

COLUMN VALUES:
T>35 = tree canopy > 35m
T20 = tree canopy 20-35m
T10 = tree canopy 10-20m
T6 = tree canopy 6-10m
S = tree or shrub 0.5-6m
H = herb layer (all herbs + woody plants 0-0.5m)
N = nonvascular

Provisional Community name (VANHP Ecological Community Group):

BASIC MESIC FOREST

II. Woody Stem Counts and Compositional Data PLOT BESP004, P.3

WOODY STEMS >= 2.5 CM DBH IN PLOT; record number of stems in the classes below if DBH < 40cm; record each stem to the nearest cm if DBH>40cm

SPECIES	2.5 - 5 cm	5 - 10 cm	10 - 15 cm	15 - 20 cm	20 - 25 cm	25 - 30 cm	30 - 35 cm	35 - 40 cm	40+ cm
LIRIODENDRON TUL.									50, 71
CARPINUS CAR.		•	•						
FAGUS GRANDIFOLIA		•		•			•	•	
CARYA GLABRA									50
ULMUS RUBRA	•	••	••						
ACER RUBRUM	•								56
LIQUIDAMBAR S.		•				•			
FRAXINUS AMER.								•	

TREE AGE DATA: use this space to record information about any increment cores collected from the plot

NO AGE DATA COLLECTED

SPECIES COMPOSITION AND COVER CLASS BY STRATUM. Record cover in the following classes: **1 = trace, 2 = a few (<1%), 3 = 1-2%, 4 = 2-5%, 5 = 5-10%, 6 = 10-25%, 7 = 25-50%, 8 = 50-75%, 9 = 75-100%.** Record cover values for each stratum AND for total cover in entire sample.

Check "Out" for taxa outside the plot, "ID" for ID for taxa of questionable identification; indicate specimens collected for later identification in the "Coll./#" column.

Out	ID	TAXON	TC		H	S	T6	T10	T20	T>35	N	Coll./ #
		LIRIODENDRON TULIPIFERA	6						6			
		CARPINUS CAROLINIANA	6			6	4					
		FAGUS GRANDIFOLIA	7			3	5		6			
		CARYA GLABRA	6		2				6			
		ULMUS RUBRA	5		2	3	5					
		ACER RUBRUM	5			2			5			
		LIQUIDAMBAR STYRACIFLUA	5			2	3		5			
		FRAXINUS AMERICANA	6			3			6			
		ASIMINA TRILOBA	7		2	7						
		LINDERA BENZOIN	5		2	5						
		CORNUS FLORIDA	3		2	3						
V		TILIA AMERICANA VAR. AMERICANA	1						1			
		CARYA CORDIFORMIS	2		2							
		ACER NEGUNDO	2		2							
		CERCIS CANADENSIS	2			2						
		CELTIS OCCIDENTALIS	1		1							
		EUONYMUS AMERICANUS	2		2							
		HYDRANGEA ARBORESCENS	1		1							
		LONICERA JAPONICA	4		4							
		PARTHENOCISSUS QUINQUEFOLIUS	2		2							
		QUERCUS ALBA	2		2							
		QUERCUS RUBRA	2		2							
		RUBUS FLAGELLARIS	2		2							
		SAMBUCUS CANADENSIS	2		2							
		SYMPHORICARPOS ORBICULATUS	2			2						
		TOXICODENDRON RADICANS	2		2							
		ASARUM CANADENSE	7		7							
		PODOPHYLLUM PELTATUM	7		7							
		POLYSTICHUM ACROSTICHOIDES	4		4							
		STELLARIA PUBERA	4		4							
		TIARELLA CORDIFOLIA VAR. COLLINA	4		4							
		CAREX DIGITALIS	4		4							
		VIOLA PUBESCENS VAR. LEIOCARPON	3		3							
		PHEGOPTERIS HEXAGONOPTERA	3		3							
	V	ELYMUS HYSTRIX VAR. HYSTRIX	3		3							
		CIRCAEA LUTETIANA SSP. CANADENSIS	3		3							
		SANGUINARIA CANADENSIS	3		3							
		CARDAMINE CONCATENATA	3		3							
		CLAYTONIA VIRGINICA	3		3							
		GALIUM CIRCAEZANS	2		2							

(SPECIES COMPOSITION AND COVER CLASS BY STRATUM -- CONTINUED) PLOT BESP004, P.4

Out	ID	TAXON	TC		H	S	T6	T10	T20	T>35	N	Coll./ #
		DUCHESNEA INDICA	2		2							
		EORYBIA DIVARICATA	2		2							
		FESTUCA SUBVERTICILLATA	2		2							
		CAREX JAMESII	2		2							
		CAREX BLANDA	2		2							
		ARISAEMA TRIPHYLLUM SSP. TRIPHYLLUM	2		2							
		GALIUM APARINE	2		2							
		PHLOX DIVARICATA	2		2							
		SMILAX PULVERULENTA	2		2							
		SOLIDAGO CAESIA	2		2							
		GERANIUM MACULATUM	2		2							
		POLYGONATUM BIFLORUM VAR. BIFLORUM	2		2							
		PHRYMA LEPTOSTACHYA	2		2							
		PACKERA OBOVATA	2		2							
		MAIANTHEMUM RACEMOSUM SSP. RACEMOSUM	2		2							
		HEPATICA AMERICANA	2		2							
		UVULARIA PERFOLIATA	2		2							
		POA AUTUMNALIS	2		2							
		BOTRYCHIUM VIRGINIANUM	1		1							
		SANICULA CANADENSIS	1		1							
		RANUNCULUS RECURVATUS	1		1							
✓		CIMICIFUGA RACEMOSA	1		1							
		POLYGONUM VIRGINIANUM	1		1							
		EPIFAGUS VIRGINIANA	1		1							
✓		NEMOPHILA APHYLLA	1		1							
		GEUM CANADENSE	1		1							

TOTAL SPECIES RICHNESS = 63 taxa

Exclude taxa rooted outside plot boundary from species richness calculation