

**Vegetation Monitoring Protocols for the
Long Island Pine Barrens Fire Management Demonstration Site Project
Adapted from the UMass Project “Managing Fuels in Northeastern Barrens”**

Plot Selection, location, and timing: (Each “plot” represents a point that will serve as the starting point for the individual transects and plots described below).

Equipment

1. map of forest with plots and stands labeled
2. handheld computer with ArcPad and GPS unit plug-in
3. Desktop/laptop computer with ArcView/ArcMap
4. Tape or other object
5. Chaining pin
6. Flagging (bright color)

Procedure

1. Stand divisions were based upon the approximate dominant vegetation types and structure of the forest (see map “National Fire Plan Demonstration Site Vegetation Community Types”). Aerial imagery, 2.4 meter multi-spectral satellite imagery and ground surveys (walk through) were used to make this assessment.
2. Treatments were assigned within these community types as listed in the table labeled “Generalized Preliminary Treatment Plan” and mapped according to prescribed fire and mechanical treatments.
3. For pre-treatment monitoring: Each contiguous area of the dominant vegetation types received a GIS grid of points offset by 100 feet from any other point and at least 75 feet from any perimeter of the unit.
4. For post treatment monitoring: Each contiguous area of treatment within the dominant vegetation types will receive a GIS grid of points offset by 100 feet from any other point and at least 75 feet from any perimeter of the unit.
5. Variable numbers of points depending on unit size and relative homogeneity were randomly selected from the grid (using either a random number table or calculator function), then located in the field using GPS. When the GPS indicates that you are nearby the plot (within approximately 50’) have any additional monitoring staff wait outside the area until plot center and transect bearing have been determined. Try to avoid trampling of fuels during the location process. When the GPS indicates the point has been reached in the field, the exact point will be selected by an individual closing his eyes, spinning several times, and tossing an object over his shoulder(ex. transect tape). A pin marking the start point will be inserted where the object lands (pin inserted into start of tape wherever it lands.) Use the GPS unit to record plot center. Record plot number, row and point number, and UTM on datasheets. Tie a piece of flagging on nearest live vegetation and record stand#, plot#, UTM, observers, and date.
6. Pre-treatment monitoring will take place during the growing season.
7. Post-treatment monitoring will take place during the growing season and vary at intervals relative to the indicator measured (For example, timing might be weeks (for fuel sampling), months (for seedlings) or years (saplings) post-treatment).

Stand Survey / Relevé

Equipment

1. At least one 50 meter measuring tape, marked in feet and tenths on one side, meters on the other
2. chaining pin
3. clinometer
4. compass
5. GPS unit with digital map of site, treatment unit boundaries and sampling point grid locations
6. paper map of site, showing treatment units and sampling point grid locations
7. List of sampling point grid locations that were randomly selected for fuel measurements
8. clipboard, pencils, sharpee marker
9. Orange plastic surveyor's flagging tape
10. blank data sheets

Relevé

Releve procedure is adapted from that used by the NY Natural Heritage Program, Community form 3. Ocular estimates of cover of each plant species are made in each of several height strata (Trees >5m (emergent, canopy, subcanopy); Tall shrub 2-5m; Short shrub <2m; Low woody & herbaceous; Ground (litter, wood >1cm, soil, rock, moss, lichen)). See data sheet. Trees and tall shrubs are estimated in a circular plot with a radius 11.3m (400 m² area). All other strata are estimated in a nested circular plot with a 5.64 m radius (100m² area). Plot sizes and shape are the same as those used at the Conservancy's Mashomack Preserve (and other forested Long Island sites), thus enabling valid comparison of data from different sites.

1. For each management unit, select for relevés several plot points where fuels were measured. Plot locations should be dispersed throughout each unit and there should be at least two plots in each treatment combination within the unit. Ideally there should be one releve plot for each 2 to 5 acres, if units range from 10 to 40 acres each.

2. Navigate to the point and locate flagging tape left by fuel monitoring crew. Pin the end of the tape to the plot center beneath the flagging. Write on flagging tape that a releve plot was done. Extend the tape 11.3 meters in any direction, but preferably towards trees that appear to be close to the 11.3 m plot boundary. Place temporary orange flagging tape on vegetation at the 5.64 and 11.3 m positions to visually locate the two plot perimeters. If needed, lay out a second tape in the opposite direction. An alternative using one tape is to lay out the tape starting at 11.3 m distant from the plot center, pass through plot center, and extend 11.3 m in the opposite direction. In this case, the perimeter of the 100 m² plot is located at 5.64 and 16.9 m.

3. For each tree species, record average height for emergent, canopy and subcanopy trees (all >5m), and for saplings (2-5m). Height can be visually estimated, and verified with occasional clinometer readings. For each species in each height strata estimate percent cover in the appropriate plot size (trees, saplings and tall shrubs in the 400 m² plot; all others in the 100 m² plot). Location of plot perimeters can be visually estimated by eye with experience, or by pacing distance from plot center (check number of paces needed with meter tape). Suggestions for estimating cover: For a few isolated trees/saplings, estimate the square meters covered by each crown. Divide by 4 to get percent coverage (4 m² = 1%). If many trees are present, estimate cover of all of the same species trees as a group. It can be helpful to imagine grouping all the trees together into ¼, ½, etc. of the plot – or estimate what percent of the plot is not covered by trees of the species. A similar approach can be taken for shrubs and herbs in the 100 m² plot

(10,000 cm²), except that 1% = 1 m²; 0.1 percent = a square 32 cm x 32 cm; 0.01% = a square 10 cm x 10 cm.

4. Optional: Record number of saplings (2-5m) and trees of each species by height strata in the 400 m² plot. If a tree or sapling appears to be near the plot perimeter, use the measuring tape to get an exact distance. If at least half of the base of the tree is within the plot, include it in the count. These density data may be redundant if tree data from variable radius plots can be subdivided into height and/or diameter size classes, by species. If so, sapling and tree densities and dbh could be omitted from the releve protocol. Trees are generally considered to be >10 cm dbh. Individuals 2-5 m tall are almost always <10 cm dbh; subcanopy trees between 5 and 8 m tall could be more or less than 10 cm dbh; most trees >8 m tall are >10 cm dbh. Record a multi-stemmed tree as one individual, and include dbh measurements within parentheses. If a sapling is a sprout from the base of a dead tree, record that information (sprouts do not represent new recruitment). Representative dbh measurements should be taken for trees of different heights to verify the correlation, or adjust protocol as needed to distinguish saplings from trees.

5. Timing: Data should be collected before mowing or burning. Ideally, sapling and tree counts should be repeated after mowing, as some saplings and small trees may be cut down by mowing.

6. Make note of the following:

- any species in the area that did not fall within the releve plot.
- fire scars, cut stumps, and other evidence of disturbance
- in plantations, make note of spacing and trend of planted rows as well as evidence as to the planting method, such as furrows.

7. *If a non-native (plant) species is encountered anywhere on site, note the species, estimate the number of individuals and area covered, and GPS the location.*

RELEVE PLOT: % COVER, STRATA HEIGHT; DENSITY

Derived in part from NY Natural Heritage Program Community Form 3

SITE: David A. Sarnoff NYS Wildlife Management Area - Fuel management demonstration area

Community Actual:		Date:	
Community Mapped:		Unit:	Point #:
Surveyor:		Row & position:	
Suffolk Co., NY. Riverhead Quad., 1 mi south of Riverhead traffic circle		Coordinates:	

Plot Size: Circle radius 11.3 m (400 m²) for trees, tall shrubs; 5.6m radius (100 m²) short shrubs, herbs

	P. rigida		Q. coccinia		Q. velutina		Q. alba		Sassafras					
trees >5m	%	ht (m)	%	ht (m)	%	ht (m)	%	ht (m)	%	ht (m)	%	ht (m)	%	ht (m)
Emergent trees														
number individuals														
dbh: record multiple stems in parentheses														
Tree canopy														
number individuals														
dbh: record multiple stems in parentheses														
Sub-canopy														
number individuals														
dbh: record multiple stems in parentheses														
if a sapling size individual is a sprout from a dead tree, record that information.														
	P. rigida		Q. coccinia		Q. velutina		Q. alba		Q. ilicifolia					
Tall Shrub (2m-5m)	%	ht (m)	%	ht (m)	%	ht (m)	%	ht (m)	%	ht (m)	%	ht (m)	%	ht (m)
	P. rigida		G. baccata		V. vacillans				Q. ilicifolia					
Short shrub (<2m)	%	ht (m)	%	ht (m)	%	ht (m)	%	ht (m)	%	ht (m)	%	ht (m)	%	ht (m)
Low woody & Herbaceous	Gaultheria p		Arcto uva-ursi		Pterid aquilinum		Carex pens.		Melampy lin					
	%		%		%		%		%		%		%	
Ground	Litter		Wood >1cm		Bare Soil		Rock				Moss		Lichen	
	%		%		%		%		%		%		%	

Note: Cover of litter, wood, soil, rock should total 100%. Cover of tree trunks (basal area) is very small and ignored. Cover of moss and lichens are separate and additional (not part of ground or low woody/herbaceous layers).

Species seen outside of releve plot:

Photographs taken? Direction facing?