

GRASSLAND VEGETATION SAMPLING PROTOCOL

SUMMER 1994

SARATOGA NATIONAL HISTORICAL PARK

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BACKGROUND:

Vegetation sampling was conducted in sixteen fields in Saratoga National Historical Park from June 29, 1994 to August 24, 1994. The sampling of these fields will assist with the managerial decision making process as it pertains to the preservation and maintenance of historic fields. In addition to the cultural significance of these fields, it has been documented that there are several New York State listed grassland bird species of special concern breeding in the Park. Therefore, the method and timing of field management needs to consider the breeding biology and habitat requirements of these bird species.

The sampled fields have been subjected to various management regimes over the years. These regimes include prescribed burning, mowing, grazing, and agricultural leasing. Each field differs in the frequency, degree and intensity of management.

The goals of this study are to: 1) provide a greater baseline understanding of the vegetation profile of each field, 2) to determine the needs of the grassland birds, and 3) to assist in the integration of an efficient management regime that will maintain the historic fields with minimal impact upon the Parks natural resources.

The following report includes a materials list, a description of the data collection process, the methodology employed, and an explanation of the data sheet and observations.

MATERIALS:

Meter square (made from four carsonite posts and L brackets)

Meter stick

Threaded rod, 7mm diameter x 1 meter long

PVC pipe, 1-1/4" diameter x 4" long

Hand compass

Abney level

Calipers

String, 1m long with a washer tied on each end (to isolate 1/5m)

Zip-lock bags (for unknown vegetation samples)

Plant nomenclature was based on Gleason and Cronquist (1991).

METHODS**Plot location:**

Most fields were sampled with 30 plots. (Due to their small size, tour road stops one and ten each contained fifteen plots.) Geographic Information Systems (GIS) were employed to obtain 30 random points per field (Sampling Unit = field). Field boundaries were taken from the Park's 1981 vegetation layer in GRASS. Distances and azimuths between sampling points were determined using a nearest neighbor estimation program in dBASE 3+. Each week the field plot points were faxed to us by Dr. Brian Underwood (National Biological Survey PH 315 470-6820 or FAX 315 470-6934).

The plot points were given in the form of a compass bearing and a distance in meters. Attachment number 1 is an example of a plot point list including a description of the starting point (labeled no. 1, we did not sample at this point). We were also supplied with a Field Sampling Map (attachment no. 2). This gave us a rough idea of what our path through the field was supposed to look like.

If in the course of traveling from one plot to the next, our ultimate destination put us "out of bounds" (ie., in the bush, on a road shoulder, a mowed area, forest, etc.), we selected a distance from a random distance table (attachment no. 3) and while using the back-azimuth, retraced our position back until we arrived at a valid sampling space (ie., open field). A distance can be selected from the random distance table in two ways. We closed our eyes and randomly chose a number from the sheet then crossed it off. The second method is to select the numbers and cross them off exactly in the order that they appear on the sheet. The method chosen should be kept consistent throughout the study. We did not go out of bounds very often. Out of sixteen fields, we went out of bounds less than 20 times.

We found that the distances (given in meters) were much easier to use when converted to paces. To accomplish this we walked a distance of 100 meters 5 times then took an average to obtain our paces per meter. We alternated pacing the fields.

To start the sampling of a field, we began at the assigned starting point (usually a landmark along the tour road chosen by Dr. Brian Underwood). We found our bearing with a hand compass and found an immovable object to use as a landmark. We traversed our required number of paces along the bearing. We remained focused on our landmark rather than looking at the ground. This reduced the amount of sample site selection bias.

Meter Square placement:

After we paced the proper distance the pacer would stop and place the meter square on the ground so that the bottom left corner touched the right front toe and the left side was in line with the landmark. The 1/5m section was always along the right outer edge of the plot, parallel to the sight line being paced (see diagram 1).

The 1/5m section of the meter square was isolated with a string which was set into place between two notches cut into the side of the meter square at the appropriate points. This allows for greater accuracy in determining which woody stem individuals are included in the 1/5m and which are outside when taking measurements.

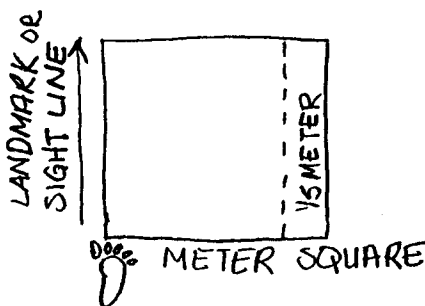


DIAGRAM 1

Litter depth:

This measurement was made using a meter stick and a piece of PVC pipe. We randomly (with our eyes closed) placed the meter stick in the plot down to the soil surface. We then fitted the PVC pipe over the top of the meter stick and let it slide gently to the ground until it hit the top of the litter layer. We made sure that live vegetation was not obstructing the pipe. We then squeezed the pipe against the meter stick and raised it to read (from the bottom of the pipe) the depth of the litter.

Density:

This measurement was made using a piece of threaded rod approximately 7mm in diameter. The rod was marked into ten sections of ten centimeters each, as defined in Whitmore (1981).

The measurement was taken by dropping the rod to the soil surface in a random spot (again, we closed our eyes, or looked away and placed the rod in the plot) perpendicular to the ground. The rod was then examined within each of its 10 centimeter increments for "hits". A "hit" was defined as any piece of live vegetation touching any portion of the rod within the specified 10 centimeter section.

Cover:

Cover is a percent estimate of the surface area covered by each genus within the meter square sample plot. The estimates of cover were based upon the Braun-Blanquet cover scale, below (Causton 1988).

<u>RATING</u>	<u>DESCRIPTION</u>
0	sparsely, or very sparsely present; cover very small
1	plentiful, but of small cover value
2	very numerous, or cover 5-20%
3	any number of individuals; cover 25-50%
4	any number of individuals; cover 50-75%
5	cover greater than 75%

Each herbaceous genus in the plot was assigned a number based on this scale. We found that the easiest way to estimate these values was to imagine that the genus in question was put into a clump, in either a corner or side of the plot. Then we estimated how much area in the plot that genus covered. For example, if we imagined that knapweed covered about 40% of the meter square when we "clumped" it together, we assigned knapweed a value of "3".

In the 1/5m each woody genus was assigned a number from this scale based on how much area it covered in the 1/5m. The woody genres were also assigned a value according to how much area they covered in the entire plot. Note that cover for each genus, woody and herbaceous, was estimated based upon its own percent of cover within the meter square. Because the vegetation consists of many overlapping layers of canopy, the sum total of percent cover for a densely populated sample plot could well exceed 100%.

Woody:

Within the 1/5m section of the meter square, each woody stemmed individual was identified to the genus level and measured. Height was measured with a meter stick to the nearest 1/10cm from the soil surface to the highest point on the plant. Using calipers, the basal diameter of each woody stemmed individual was measured at the soil surface to the nearest 1/10cm.

EXPLANATION OF DATA SHEET ENTRIES (Attachment 4)

Field: Each field was assigned a number from the updated 1981 Field List (see attachment no. 5, for a map of the fields see attachment no. 6).

Slope and Aspect: At each point, the slope and aspect of the terrain were measured in degrees. The slope was measured using an Abney level and the aspect was measured with the aid of a compass.

Herbaceous height: Using a meter stick, we measured the tallest living herbaceous plant in the plot to its highest point, to the nearest 1/10cm.

Litter depth: This measurement was determined with the use of a meter stick and a piece of PVC pipe, to the nearest 1/10cm.

Density: This measurement was recorded by determining how many "hits" occurred in each section of the density rod.

Dead herbaceous: The number of dead herbaceous stems standing at an angle greater than 45 in the 1/5m section.

Cover: This recording is comprised of four parts: first, within the meter square plot each herbaceous plant was identified to the genus and given a cover value based on the Braun-Blanquet scale. Next, each woody stemmed genus located in the 1/5m was given a cover value based upon the same scale for how much area it covered in that section. Third, woody stemmed genera were given a cover for how much area they covered in the entire plot. Last, a ground cover value was assigned to the plot as a whole encompassing all vegetation in the meter square (leaf litter was considered cover).

This value is a comparison of the amount of vegetative cover versus how much bare soil is visible. For example, if the plot was covered with 65% vegetation and 35% bare soil the cover value would be assigned a "4". For this measurement, the sum total of percentages would equal 100%.

Herbs: Each herbaceous plant in the meter square was identified to the genus and given a cover value from the Braun-Blanquet scale.

Woody: Within the 1/5m section, each woody stemmed individual was identified to the genus level. For each individual stem the height and diameter were measured to the nearest 1/10cm using a meter stick and calipers.

DATA ENTRY

We entered our data into two data base files using dBASE III. File name FLDDIVR2 is the data on the top portion of the data sheet (attachment 4) and contains 607 records. File name FIELDVG2 is the data from the bottom portion of the data sheet (HERBS and WOODYS) and contains approximately 6,700 records.

REFERENCES

- Causton, David R. 1988. An Introduction to Vegetation Analysis. Unwin Hyman, London. pg 8.
- Gleason, Henry A. and Cronquist, Arthur. 1991. Manual of Vascular Plants of Northeastern United States and Adjacent Canada. The New York Botanical Garden. Bronx, New York.
- Martin, Chris. 1993. Vegetation Sampling Notes, Summer 1993. Saratoga National Historical Park, New York.
- Whitmore, Robert C. 1981. Structural Characteristics of Grasshopper Sparrow Habitat. J. Wildl. Manage. 45(3):811-814.

Gannon Field

PLOT	XCOORD	YCOORD	DISTANCE (m)	AZIMUTH
1	610300	4762027	0	0
11	610312	4762016	16	135
19	610365	4761999	56	108
2	610360	4761947	52	185
3	610407	4761953	47	83
12	610389	4761892	64	196
29	610405	4761870	27	144
16	610436	4761884	34	67
8	610449	4761865	23	145
22	610485	4761895	47	50
24	610468	4761934	42	337
6	610486	4761999	68	15
17	610547	4761994	61	95
10	610554	4761947	47	172
5	610609	4761975	62	64
15	610693	4761974	83	91
20	610680	4762028	56	347
30	610559	4762046	122	278
4	610625	4761838	218	163
23	610582	4761792	64	223
21	610553	4761816	38	310
14	610513	4761799	43	247
31	610504	4761798	9	264
18	610512	4761833	35	13
7	610549	4761770	73	149
27	610476	4761736	81	245
26	610417	4761776	71	304
28	610408	4761767	13	225
13	610423	4761799	35	24
9	610343	4761809	81	277
25	610323	4761890	83	346

Starting point, labled No. 1, is on the Tour Road directly in a line with the North edge of this field. This will place you approximately half way around the curve heading toward Stop 6.

ATTACHMENT I

Field Sampling Map Oannon Field

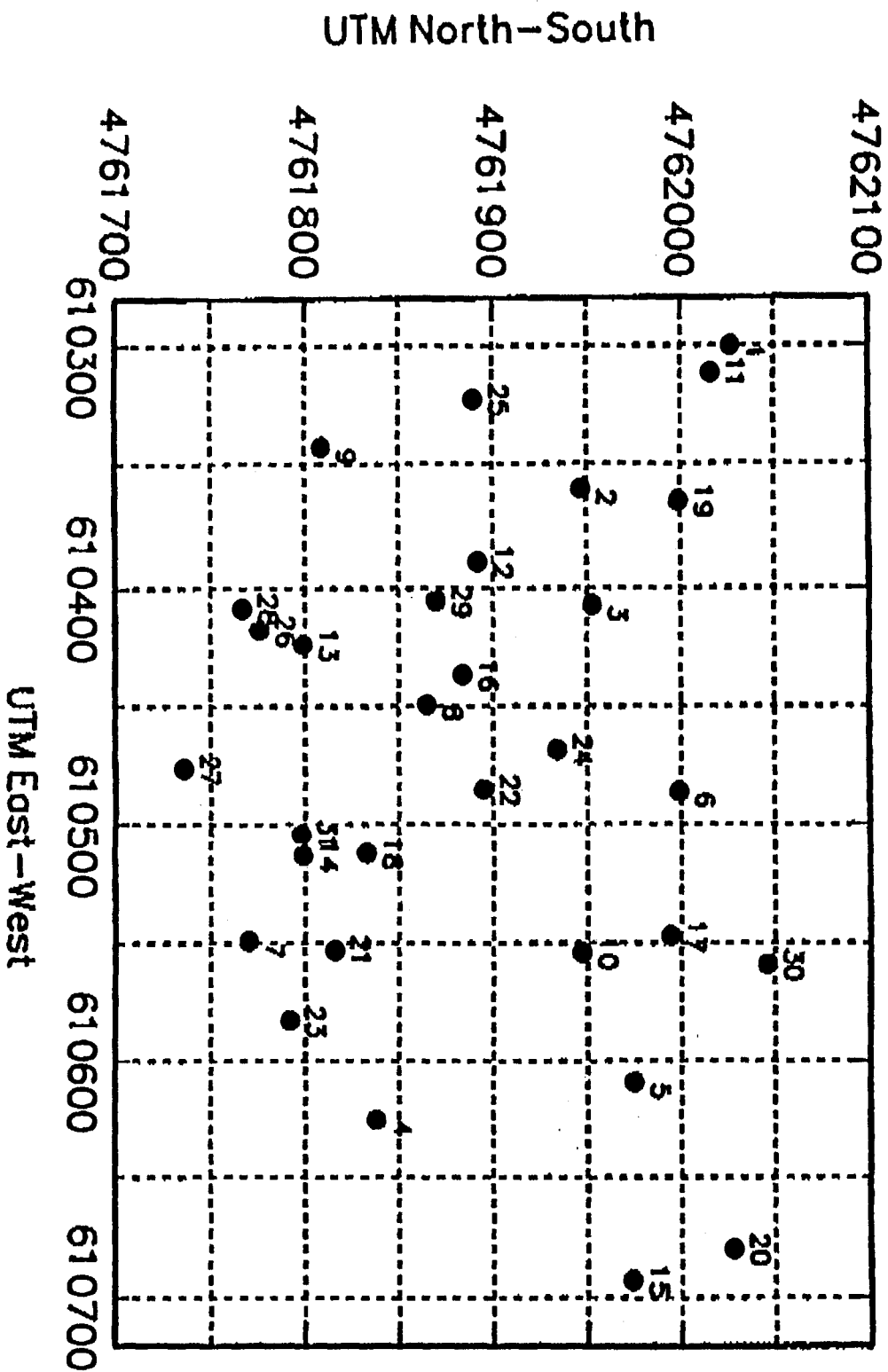


Table of Random Distances (m)

17	13	12	16	23	39	36	47	50	12
38	29	17	23	1	15	20	35	31	31
30	37	13	29	41	44	3	36	24	44
34	2	25	1	15	4	13	6	28	45
34	20	31	50	8	35	6	21	31	13
13	35	22	44	32	43	28	43	23	22
19	47	18	24	39	21	25	24	9	4
26	25	24	10	29	2	6	28	18	9
48	23	50	20	22	33	8	39	22	23
50	40	19	31	8	27	9	21	40	25
11	33	30	36	21	31	34	36	9	3
37	28	21	14	44	37	27	3	41	15
22	34	33	40	26	46	4	11	35	3
13	7	19	44	40	28	24	33	46	1
19	9	11	28	1	37	45	42	7	4
29	23	28	27	22	20	39	35	3	1
18	16	41	20	34	35	7	1	33	16
13	47	36	46	42	9	37	40	9	20
6	37	24	12	40	1	18	32	20	6
16	24	7	25	26	15	5	9	30	25
49	30	37	1	8	15	29	22	29	25
14	24	24	2	25	33	9	6	20	13
34	29	42	2	17	35	16	41	32	15
9	41	33	26	11	46	32	34	14	42
27	49	16	15	2	12	3	42	22	48
28	49	44	9	48	3	3	23	14	45
16	40	31	38	8	38	47	22	46	17
21	10	42	5	4	41	30	2	11	30
15	36	5	15	36	8	33	11	45	44
17	7	27	47	42	17	40	42	40	29
13	31	2	9	13	42	49	44	14	24
16	49	27	6	1	13	34	38	23	1
25	47	11	1	39	34	9	27	27	27
44	18	42	27	46	39	4	10	49	49
39	27	45	50	42	6	7	43	38	28
4	22	49	30	14	25	4	3	33	18
20	22	44	38	24	3	46	50	22	9
21	44	44	38	24	3				

ATTACHMENT 3

FIELD VEGETATION DATA SHEET: Baratoya National Historical Park

Data 94

Field _____

Point _____

Slope/Asp. _ _ / _ _ _

Herbaceous lt. _ _ _ . _

Litter Depth

Dead herbaceous (1/5m) _ _ _

DENSITY

VI

V2

V3

V4

V5

V6 _____

V7

VB _____

v9

V10

Ground Cover

-11ER00

WOODY

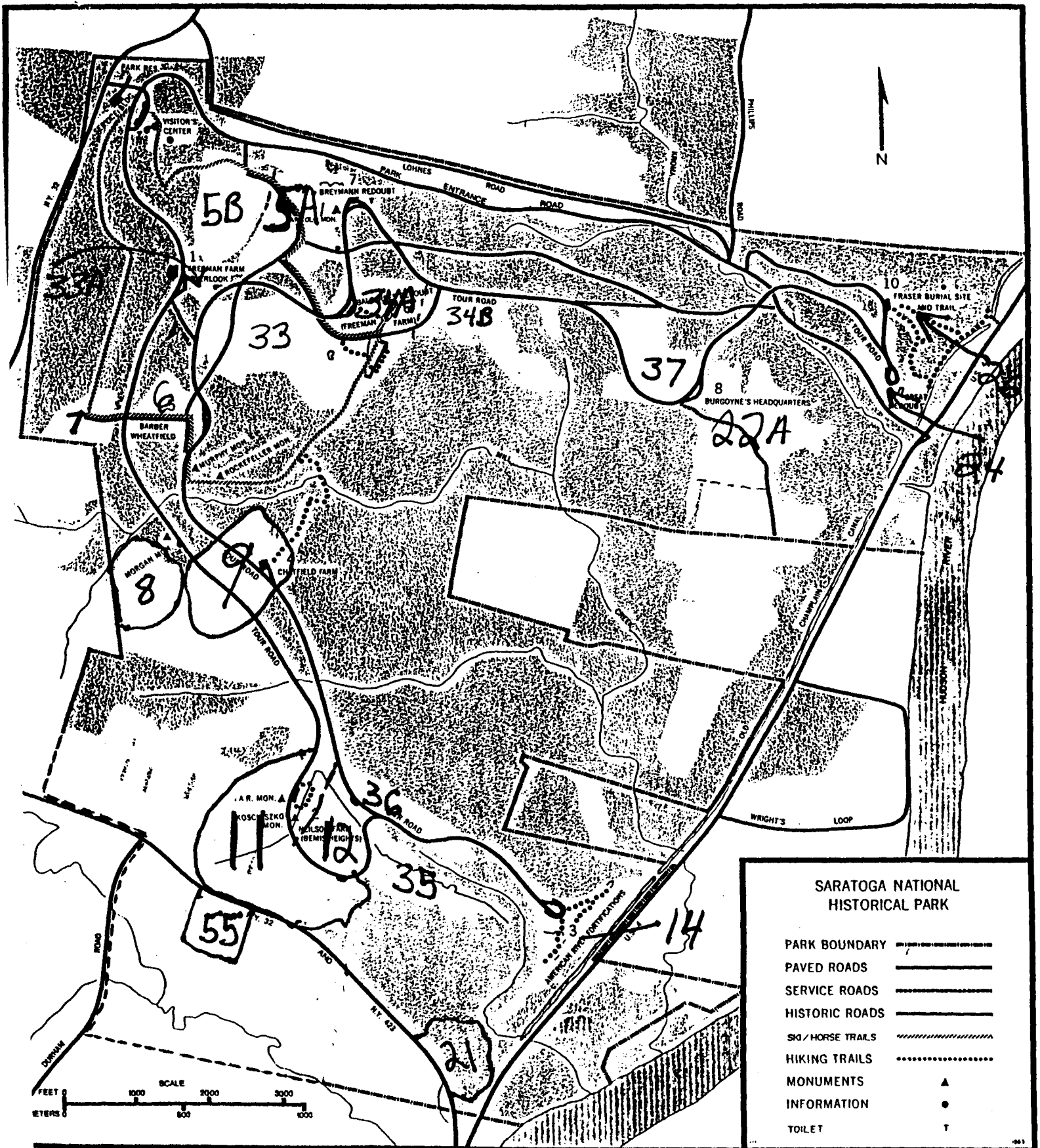
[illegible]

ATTN: 444211 1

UPDATED 1981 FIELD NAME LIST

FIELD NUMBER	COMMON USAGE NAME
33	GANNON FIELD
6	BARBER WHEATFIELD
34A	STOP 6-1
34B	STOP 6-2
7	EXCLOSURE 1 FIELD
33A	STOP 1 (15 PLOTS)
22A	STOP 8
37	FERN FIELD
5A	STOP 7 EAST
5B	STOP 7 WEST
24	STOP 9
26	STOP 10 (15 PLOTS)
14	STOP 3
8	MORGAN MONUMENT FIELD
36	STOP 2A
12	STOP 2B
35	STOP 2C
11	STOP 2D
9	STOP 4
55	PRICE FARM
21	BEMIS HEIGHTS

Grassland Vegetation Sampling Field Units & Numbers Summer 1994



ATTACHMENT 6