

ESTIMATING GYPSY MOTH EGG MASS DENSITIES

Donald A. Eggen, Graduate Assistant

Dr. Lawrence P. Abrahamson, Senior Research Associate

State University of New York
College of Environmental Science and Forestry
Syracuse, New York 13210

Estimating Gypsy Moth Egg Mass Densities

A fast and accurate method of estimating gypsy moth egg mass densities is needed to monitor gypsy moth populations and to evaluate potential treatment areas. This paper describes a method of estimating gypsy moth egg mass densities based on a USDA Forest Service fixed - and variable - radius plot method¹ and a five-minute walk egg mass count. The latter was developed by the College of Environmental Science and Forestry for the New York State Department of Environmental Conservation (DEC) to select areas for inclusion in New York State's gypsy moth integrated pest management (IPM) program.

Currently, states with large gypsy moth programs utilize a variety of methods and plot sizes to estimate egg mass densities: 1/40th acre, 1/100th hectare, basal area factor (BAF)-10 and BAF-20 prism plots. When egg mass densities are high, sampling is not necessary for trained personnel to determine whether or not an area requires treatment. However, in moderate to low populations surveys are required to obtain reasonably accurate estimates of egg mass density. Field crews must survey many areas and they cannot afford to spend a lot of time at each site. In order to facilitate accuracy and to minimize the time needed to estimate egg mass densities, we compared the 5-minute walk egg mass count method to the variable- and fixed-radius plot method (using the BAF-20 prism).

Five BAF-20 prism plots were established in each of 34 blocks in Orange Co., NY. Plot centers were approximately 2 chains apart (132 ft.) and all trees within each plot were flagged and marked with metal tags. Three egg mass surveys were conducted in these plots (spring 1980, fall 1980, and fall 1981), and the data were converted to estimates of egg masses per acre (em/A). The 5-minute walk method was done as follows: two people started at prism plot 1 and walked for 5 minutes along the line of sample plots and counted new egg masses. The walk ended near prism plot 5, or approximately 8 chains (528 ft.) from the starting point. The average of the two 5-minute walk egg mass counts was plotted against the BAF-20 estimate of egg masses per acre. Regression analysis was used to determine if 5-minute walk egg mass counts and estimates of em/A obtained from the BAF-20 prism plots were correlated. Significant correlations were found for each of the three years of the study. A sample data form for recording egg mass survey data appears at the end of this report.

¹USDA Agr. Handbk. No. 523, Gypsy Moth Egg-Mass Sampling with Fixed- and Variable- Radius Plots.

This method of estimating egg mass density is useful for agencies that must survey vast acreages to identify areas that should be included in a gypsy moth IPM program. In New York State, areas that meet specified land use criteria must also meet certain egg mass density thresholds before treatment is considered as part of an integrated program. For increasing gypsy moth populations (i.e., egg mass density has increased from previous year), 200 em/A or more must be present before any treatment is considered. In declining populations (i.e., egg mass density has decreased from previous year) 400 em/A is the minimum threshold. These egg mass density thresholds were established by the DEC and are used together with egg viability and parasitism data to identify potential treatment areas. More accurate surveys must be conducted when densities are at or near these em/A thresholds. Under these circumstances, a minimum of three variable- and fixed-radius plots (BAF-20 prism) will provide reliable estimates of egg mass numbers (i.e., when the average of two 5-minute walk egg mass counts is less than 40). The actual number of plots used depends on stand size, stand composition and time available. Densities that are substantially above these minimum thresholds (e.g., 800+ em/A) can be satisfactorily estimated with the 5-minute walk egg mass count (i.e., when the average of the two 5-minute walk egg mass counts is greater than 40).

When the average of two 5-minute walk counts exceeds 40 em, Tables 2 to 4 are used to estimate the egg mass density. The age of the outbreak will determine which table is appropriate; a description of the conditions for each year of an outbreak cycle is given with each table. Table 1² is included to help with survey activities in those areas that experience a buildup of the gypsy moth for the first time. Table 5³ can be used to compute the overstory egg mass density when the BAF-20 prism variable-radius plot method is used. The egg mass density values for all trees surveyed in the BAF-20 prism plots should be summed and then divided by the number of prism points in order to obtain an estimate of overstory em/A. For example, five BAF-20 prism plots are established, tree diameter at breast height (dbh) is recorded to the nearest inch and binoculars are used to count all new egg masses on each tree. The egg mass density value for each dbh is obtained from Table 5 (e.g., 5 egg masses on a 10 inch tree equals an egg mass density value of 183). The egg mass density values for all trees in the five BAF-20 prism plots are summed and then divided by 5 (the number of prism plots used) to obtain an estimate of overstory em/A. Understory egg mass density is determined by counting the

²Data provided by E. Eckess, USDA-APHIS, University Park, PA.

³USDA Agr. Handbk. No.523, Gypsy Moth Egg-mass Sampling with Fixed- and Variable-Radius Plots.

egg masses in an 8.3 ft. radius mini-plot (1/200th acre) at each prism point. Egg mass counts are summed over the number of prism points used, multiplied by 200, and divided by the number of prism points. Next, this value is added to the overstory em/A value to obtain the total egg mass density estimate. Understory egg mass surveys using the 8.3 ft. mini-plot should always be taken because gypsy moths in increasing populations tend to lay their egg masses in concealed locations on the ground, under logs and rocks. As the population increases, more egg masses are found on tree boles and the underside of branches. The variable- and fixed- radius plot egg mass survey method is recommended when the population is not extremely high, (less than 800 em/A), therefore, the understory contribution to the total egg mass density will be significant.

This egg mass survey method can be used to augment a permanent sample plot monitoring system. The 5-minute walk egg mass count portion of the method allows for a quick assessment of a particular area and can support the information obtained from permanent sample plots. This approach can easily be incorporated into a state's survey and monitoring program for the gypsy moth.

Summary of Sampling Procedure:

1. Take two 5-minute walks per area counting the new egg masses. Each walk should cover a distance of approximately 525 feet (160 meters). We suggest taking one egg mass count going in one predetermined direction, then turning around and taking the second egg mass count along the same route if one person is surveying. If two people are surveying, then each person should take a 5-minute count going in the same direction.
2. An old-to-new egg mass ratio may have to be determined if the survey crew has a difficult time distinguishing the difference between old and new egg masses. This is especially a problem when surveys are done in the spring instead of the fall of the year. One hundred egg masses should be examined in each area to determine the old-to-new egg mass ratio. If an old-to-new ratio is determined, then during the 5-minute walk all egg masses are counted (old and new). The number of new egg masses counted is determined from the old-to-new ratio. We strongly recommend that egg mass surveys be conducted in the fall of the year when it is easier to distinguish new from old egg masses. We recommend the use of hand-counters when doing the 5-minute walk.

3. If the average of the two 5-minute walk egg mass counts exceeds 40 egg masses, em/A can be estimated using Tables 1-4. The duration of the gypsy moth outbreak in the area will determine which table should be used.
4. If the average of the two 5-minute walk egg mass counts is less than 40 em , then the variable- and fixed-radius plot method using a BAF-20 prism should be used to estimate em/A . A minimum of 3 prism plots per area should be used. Table 5 can be used to determine the overstory portion of the total estimated em/A . The estimated understory em/A is added to the overstory estimate to obtain a total em/A .

Table 1. Estimating Gypsy Moth Egg Masses Per Acre in Newly Infested Areas.

X	Y	X	Y	X	Y	X	Y	X	Y
1	35	17	364	33	693	49	1022	65	1351
2	56	18	385	34	714	50	1043	66	1372
3	76	19	405	35	734	51	1063	67	1392
4	97	20	426	36	755	52	1084	68	1413
5	117	21	446	37	775	53	1104	69	1433
6	138	22	467	38	796	54	1125	70	1454
7	159	23	487	39	816	55	1145	71	1474
8	179	24	508	40	837	56	1166	72	1495
9	200	25	529	41	858	57	1187	73	1515
10	220	26	549	42	878	58	1207	74	1536
11	241	27	570	43	899	59	1228	75	1557
12	261	28	590	44	919	60	1248	76	1577
13	282	29	611	45	940	61	1269	77	1598
14	302	30	631	46	960	62	1289	78	1618
15	323	31	652	47	981	63	1310	79	1639
16	344	32	673	48	1001	64	1330	80	1659

X = Average of Two 5-Minute Walk Egg Mass Counts.

Y = Estimated Egg Masses Per Acre.

$$Y = 20.56 (X) + 14.58$$

$R^2 = 0.66$ (this means 66% of the variation in y is explained by x).

Criteria:

Use this Table (Equation) in areas experiencing an infestation for the first time. The egg mass densities should be very low. Heavy defoliation is not expected in the Spring, but some defoliation is likely.

This Table (Equation) is most accurate for X values between 1 and 21.

Table 2. Estimating Gypsy Moth Egg Masses Per Acre in the First Year of An Outbreak.

X	Y	X	Y	X	Y	X	Y	X	Y
40	793	85	1299	130	1806	175	2313	220	2819
41	804	86	1311	131	1817	176	2324	221	2831
42	815	87	1322	132	1828	177	2335	222	2842
43	826	88	1333	133	1840	178	2346	223	2853
44	838	89	1344	134	1851	179	2358	224	2864
45	849	90	1356	135	1862	180	2369	225	2876
46	860	91	1367	136	1874	181	2380	226	2887
47	871	92	1378	137	1885	182	2391	227	2898
48	883	93	1389	138	1896	183	2403	228	2909
49	894	94	1401	139	1907	184	2414	229	2921
50	905	95	1412	140	1919	185	2425	230	2932
51	916	96	1423	141	1930	186	2437	231	2943
52	928	97	1434	142	1941	187	2448	232	2954
53	939	98	1446	143	1952	188	2459	233	2966
54	950	99	1457	144	1964	189	2470	234	2977
55	961	100	1468	145	1975	190	2482	235	2988
56	973	101	1479	146	1986	191	2493	236	3000
57	984	102	1491	147	1997	192	2504	237	3011
58	995	103	1502	148	2009	193	2515	238	3022
59	1007	104	1513	149	2020	194	2527	239	3033
60	1018	105	1524	150	2031	195	2538	240	3045
61	1029	106	1536	151	2042	196	2549	241	3056
62	1040	107	1547	152	2054	197	2560	242	3067
63	1052	108	1558	153	2065	198	2572	243	3078
64	1063	109	1570	154	2076	199	2583	244	3090
65	1074	110	1581	155	2087	200	2594	245	3101
66	1085	111	1592	156	2099	201	2605	246	3112
67	1097	112	1603	157	2110	202	2617	247	3123
68	1108	113	1615	158	2121	203	2628	248	3135
69	1119	114	1626	159	2133	204	2639	249	3146
70	1130	115	1637	160	2144	205	2650	250	3157
71	1142	116	1648	161	2155	206	2662	251	3168
72	1153	117	1660	162	2166	207	2673	252	3180
73	1164	118	1671	163	2178	208	2684	253	3191
74	1175	119	1682	164	2189	209	2696	254	3202
75	1187	120	1693	165	2200	210	2707	255	3213
76	1198	121	1705	166	2211	211	2718	256	3225
77	1209	122	1716	167	2223	212	2729	257	3236
78	1220	123	1727	168	2234	213	2741	258	3247
79	1232	124	1738	169	2245	214	2752	259	3259
80	1243	125	1750	170	2256	215	2763	260	3270
81	1254	126	1761	171	2268	216	2774	261	3281
82	1265	127	1772	172	2279	217	2786	262	3292
83	1277	128	1783	173	2290	218	2797	263	3304
84	1288	129	1795	174	2301	219	2808	264	3315

Table 2. Continued.

X	Y	X	Y	X	Y	X	Y	X	Y
265	3326	298	3698	330	4058	362	4418	394	4779
266	3337	299	3709	331	4069	363	4430	395	4790
267	3349	300	3720	332	4080	364	4441	396	4801
268	3360	301	3731	333	4092	365	4452	397	4812
269	3371	302	3743	334	4103	366	4463	398	4824
270	3382	303	3754	335	4114	367	4475	399	4835
271	3394	304	3765	336	4126	368	4486	400	4846
272	3405	305	3776	337	4137	369	4497	401	4857
273	3416	306	3788	338	4148	370	4508	402	4869
274	3427	307	3799	339	4159	371	4520	403	4880
275	3439	308	3810	340	4171	372	4531	404	4891
276	3450	309	3822	341	4182	373	4542	405	4902
277	3461	310	3833	342	4193	374	4553	406	4914
278	3472	311	3844	343	4204	375	4565	407	4925
279	3484	312	3855	344	4216	376	4576	408	4936
280	3495	313	3867	345	4227	377	4587	409	4948
281	3506	314	3878	346	4238	378	4598	410	4959
282	3517	315	3889	347	4249	379	4610	411	4970
283	3529	316	3900	348	4261	380	4621	412	4981
284	3540	317	3912	349	4272	381	4632	413	4993
285	3551	318	3923	350	4283	382	4643	414	5004
286	3563	319	3934	351	4294	383	4655	415	5015
287	3574	320	3945	352	4306	384	4666	416	5026
288	3585	321	3957	353	4317	385	4677	417	5038
289	3596	322	3968	354	4328	386	4689	418	5049
290	3608	323	3979	355	4339	387	4700	419	5060
291	3619	324	3990	356	4351	388	4711	420	5071
292	3630	325	4002	357	4362	389	4722	421	5083
293	3641	326	4013	358	4373	390	4734	422	5094
294	3653	327	4024	359	4385	391	4745	423	5105
295	3664	328	4035	360	4396	392	4756	424	5116
296	3675	329	4047	361	4407	393	4767	425	5128
297	3686								

X = Average of Two 5-Minute Walk Egg Mass Counts.

Y = Estimated Egg Masses Per Acre

$$Y = 11.26 (X) + 342.16 \quad R^2 = 0.64$$

Criteria:

Use this Table (Equation) in a building gypsy moth population. The first year of heavy defoliation is expected in the Spring. The egg masses are large and healthy. There are more new than old egg masses in the area (very hard to find any old egg masses). This Table (Equation) is most accurate for X values between 40 and 195.

Table 3. Estimating Gypsy Moth Egg Masses Per Acre in the Second Year of An Outbreak.

X	Y	X	Y	X	Y	X	Y	X	Y
40	2388	80	3342	120	4296	160	5249	200	6203
41	2412	81	3366	121	4319	161	5273	201	6226
42	2436	82	3389	122	4343	162	5297	202	6250
43	2460	83	3413	123	4367	163	5321	203	6274
44	2484	84	3437	124	4391	164	5345	204	6298
45	2508	85	3461	125	4415	165	5369	205	6322
46	2531	86	3485	126	4438	166	5393	206	6346
47	2555	87	3509	127	4462	167	5416	207	6369
48	2579	88	3533	128	4486	168	5440	208	6393
49	2603	89	3556	129	4510	169	5464	209	6417
50	2627	90	3580	130	4534	170	5487	210	6441
51	2650	91	3604	131	4558	171	5511	211	6465
52	2674	92	3628	132	4582	172	5535	212	6489
53	2698	93	3652	133	4606	173	5559	213	6513
54	2722	94	3676	134	4630	174	5583	214	6536
55	2746	95	3700	135	4653	175	5607	215	6560
56	2770	96	3723	136	4677	176	5630	216	6584
57	2793	97	3747	137	4701	177	5654	217	6608
58	2817	98	3771	138	4725	178	5678	218	6632
59	2841	99	3795	139	4749	179	5702	219	6656
60	2865	100	3819	140	4773	180	5726	220	6679
61	2889	101	3842	141	4796	181	5750	221	6703
62	2913	102	3866	142	4820	182	5773	222	6727
63	2937	103	3890	143	4844	183	5797	223	6751
64	2960	104	3914	144	4868	184	5821	224	6775
65	2984	105	3938	145	4892	185	5845	225	6799
66	3008	106	3962	146	4916	186	5869	226	6822
67	3032	107	3985	147	4940	187	5893	227	6846
68	3056	108	4009	148	4963	188	5917	228	6870
69	3080	109	4033	149	4987	189	5940	229	6894
70	3104	110	4057	150	5011	190	5964	230	6918
71	3127	111	4081	151	5035	191	5988	231	6942
72	3151	112	4105	152	5059	192	6012	232	6965
73	3175	113	4129	153	5083	193	6036	233	6989
74	3199	114	4152	154	5106	194	6060	234	7013
75	3223	115	4177	155	5130	195	6083	235	7037
76	3246	116	4200	156	5154	196	6107	236	7061
77	3270	117	4224	157	5178	197	6131	237	7085
78	3294	118	4248	158	5202	198	6155	238	7109
79	3318	119	4272	159	5226	199	6179	239	7132

Table 3. Continued.

X	Y	X	Y	X	Y	X	Y	X	Y
240	7156	280	8110	320	9063	360	10017	400	10972
241	7180	281	8134	321	9087	361	10041	401	10994
242	7204	282	8157	322	9111	362	10065	402	11018
243	7228	283	8181	323	9135	363	10089	403	11042
244	7252	284	8205	324	9159	364	10112	404	11066
245	7275	285	8229	325	9183	365	10136	405	11090
246	7299	286	8253	326	9206	366	10160	406	11114
247	7323	287	8277	327	9230	367	10184	407	11137
248	7347	288	8301	328	9254	368	10208	408	11161
249	7371	289	8324	329	9278	369	10232	409	11185
250	7395	290	8348	330	9302	370	10255	410	11209
251	7418	291	8372	331	9326	371	10279	411	11233
252	7442	292	8396	332	9349	372	10303	412	11257
253	7466	293	8420	333	9373	373	10327	413	11281
254	7490	294	8444	334	9397	374	10351	414	11304
255	7514	295	8467	335	9421	375	10375	415	11328
256	7538	296	8491	336	9445	376	10398	416	11352
257	7561	297	8515	337	9469	377	10422	417	11376
258	7585	298	8539	338	9493	378	10446	418	11400
259	7609	299	8563	339	9516	379	10470	419	11424
260	7633	300	8588	340	9540	380	10494	420	11447
261	7657	301	8610	341	9564	381	10518	421	11471
262	7681	302	8634	342	9588	382	10541	422	11495
263	7705	303	8658	343	9612	383	10565	423	11519
264	7728	304	8682	344	9636	384	10589	424	11543
265	7752	305	8706	345	9659	385	10613	425	11567
266	7776	306	8730	346	9683	386	10637	426	11590
267	7800	307	8753	347	9707	387	10661	427	11614
268	7824	308	8777	348	9731	388	10685	428	11638
269	7848	309	8801	349	9755	389	10708	429	11662
270	7871	310	8825	350	9780	390	10732	430	11686
271	7895	311	8849	351	9802	391	10756	431	11710
272	7919	312	8873	352	9826	392	10780	432	11733
273	7943	313	8897	353	9850	393	10804	433	11757
274	7967	314	8920	354	9874	394	10828	434	11781
275	7991	315	8944	355	9898	395	10851	435	11805
276	8014	316	8968	356	9922	396	10875	436	11829
277	8038	317	8992	357	9945	397	10899	437	11853
278	8062	318	9016	358	9969	398	10923	438	11877
279	8086	319	9040	359	9993	399	10947	439	11900

Table 3. Continued.

X	Y	X	Y	X	Y	X	Y	X	Y
440	11924	456	12306	471	12663	486	13021	501	13378
441	11948	457	12329	472	12687	487	13045	502	13402
442	11972	458	12353	473	12711	488	13069	503	13426
443	11996	459	12377	474	12735	489	13092	504	13450
444	12020	460	12401	475	12759	490	13116	505	13474
445	12043	461	12425	476	12782	491	13140	506	13498
446	12067	462	12449	477	12806	492	13164	507	13521
447	12091	463	12473	478	12830	493	13188	508	13545
448	12115	464	12496	479	12854	494	13212	509	13569
449	12139	465	12520	480	12879	495	13235	510	13593
450	12164	466	12544	481	12902	496	13259	511	13617
451	12186	467	12568	482	12925	497	13283	512	13641
452	12210	468	12592	483	12949	498	13307	513	13665
453	12234	469	12616	484	12973	499	13331	514	13688
454	12258	470	12639	485	12997	500	13355	515	13714
455	12282								

X = Average of Two 5-Minute Walk Egg Mass Counts.

Y = Estimated Egg Masses Per Acre

$$Y = 23.84 (X) + 1434.61$$

$$R^2 = 0.59$$

Criteria:

Use this Table (Equation) during the second year of an outbreak. The area should have already experienced one year of heavy defoliation, and a second year of defoliation is expected. The egg mass densities are very high. There are more new than old egg masses, but the new egg masses are smaller than the previous year's egg masses. This Table (Equation) is most accurate for X values between 60 and 340.

Table 4. Estimating Gypsy Moth Egg Masses Per Acre in the Third Year of An Outbreak.

X	Y	X	Y	X	Y	X	Y	X	Y
40	916	80	1572	120	2228	160	2884	200	3540
41	932	81	1588	121	2244	161	2900	201	3556
42	948	82	1604	122	2260	162	2916	202	3572
43	965	83	1621	123	2277	163	2933	203	3589
44	981	84	1637	124	2293	164	2949	204	3605
45	998	85	1654	125	2310	165	2966	205	3621
46	1014	86	1670	126	2326	166	2982	206	3638
47	1030	87	1686	127	2342	167	2998	207	3654
48	1047	88	1703	128	2359	168	3015	208	3671
49	1063	89	1719	129	2375	169	3031	209	3687
50	1080	90	1736	130	2392	170	3047	210	3703
51	1096	91	1752	131	2408	171	3064	211	3720
52	1112	92	1768	132	2424	172	3080	212	3736
53	1129	93	1785	133	2441	173	3097	213	3753
54	1145	94	1801	134	2457	174	3113	214	3769
55	1162	95	1818	135	2474	175	3130	215	3785
56	1178	96	1834	136	2490	176	3146	216	3802
57	1194	97	1850	137	2506	177	3162	217	3818
58	1211	98	1867	138	2523	178	3179	218	3835
59	1227	99	1883	139	2539	179	3195	219	3851
60	1244	100	1900	140	2556	180	3211	220	3867
61	1260	101	1916	141	2572	181	3228	221	3884
62	1276	102	1932	142	2588	182	3244	222	3900
63	1293	103	1949	143	2605	183	3261	223	3917
64	1309	104	1965	144	2621	184	3277	224	3933
65	1326	105	1982	145	2638	185	3293	225	3949
66	1342	106	1998	146	2654	186	3310	226	3966
67	1358	107	2014	147	2670	187	3326	227	3982
68	1375	108	2031	148	2687	188	3343	228	3999
69	1391	109	2047	149	2703	189	3359	229	4016
70	1408	110	2064	150	2720	190	3375	230	4031
71	1424	111	2080	151	2736	191	3392	231	4048
72	1440	112	2096	152	2752	192	3408	232	4064
73	1457	113	2113	153	2769	193	3425	233	4081
74	1473	114	2129	154	2785	194	3441	234	4097
75	1490	115	2146	155	2802	195	3457	235	4113
76	1506	116	2162	156	2818	196	3474	236	4130
77	1522	117	2178	157	2834	197	3490	237	4146
78	1539	118	2195	158	2851	198	3507	238	4163
79	1555	119	2211	159	2867	199	3523	239	4179

Table 4. Continued.

X	Y	X	Y	X	Y	X	Y	X	Y
240	4195	280	4851	320	5507	360	6163	400	6821
241	4212	281	4868	321	5524	361	6180	401	6836
242	4228	282	4884	322	5540	362	6196	402	6852
243	4245	283	4901	323	5557	363	6213	403	6869
244	4261	284	4917	324	5573	364	6229	404	6885
245	4277	285	4933	325	5589	365	6245	405	6901
246	4294	286	4950	326	5606	366	6262	406	6918
247	4310	287	4966	327	5622	367	6278	407	6934
248	4327	288	4983	328	5639	368	6295	408	6951
249	4343	289	4999	329	5655	369	6311	409	6967
250	4360	290	5015	330	5671	370	6327	410	6983
251	4376	291	5032	331	5688	371	6344	411	7000
252	4392	292	5048	332	5704	372	6360	412	7016
253	4409	293	5065	333	5721	373	6377	413	7033
254	4425	294	5081	334	5737	374	6393	414	7049
255	4441	295	5097	335	5753	375	6409	415	7065
256	4458	296	5114	336	5770	376	6426	416	7082
257	4474	297	5130	337	5786	377	6442	417	7098
258	4491	298	5147	338	5803	378	6459	418	7115
259	4507	299	5163	339	5819	379	6475	419	7131
260	4523	300	5180	340	5835	380	6491	420	7147
261	4540	301	5196	341	5852	381	6508	421	7164
262	4556	302	5212	342	5868	382	6524	422	7180
263	4573	303	5229	343	5885	383	6541	423	7197
264	4589	304	5245	344	5901	384	6557	424	7213
265	4605	305	5261	345	5917	385	6573	425	7229
266	4622	306	5278	346	5934	386	6590	426	7246
267	4638	307	5294	347	5950	387	6606	427	7262
268	4655	308	5311	348	5967	388	6623	428	7279
269	4671	309	5327	349	5983	389	6639	429	7295
270	4687	310	5343	350	6000	390	6655	430	7311
271	4704	311	5360	351	6016	391	6672	431	7328
272	4720	312	5376	352	6032	392	6688	432	7344
273	4737	313	5393	353	6049	393	6705	433	7361
274	4753	314	5409	354	6065	394	6721	434	7377
275	4769	315	5425	355	6081	395	6737	435	7393
276	4786	316	5442	356	6098	396	6754	436	7410
277	4802	317	5458	357	6114	397	6770	437	7426
278	4819	318	5475	358	6131	398	6787	438	7443
279	4835	319	5491	359	6147	399	6803	439	7459

Table 4. Continued.

X	Y	X	Y	X	Y	X	Y	X	Y
440	7475	453	7689	466	7902	478	8099	490	8295
441	7492	454	7705	467	7918	479	8115	491	8312
442	7508	455	7721	468	7935	480	8131	492	8328
443	7525	456	7738	469	7951	481	8148	493	8345
444	7541	457	7754	470	7967	482	8164	494	8361
445	7557	458	7771	471	7984	483	8181	495	8377
446	7574	459	7787	472	8000	484	8197	496	8394
447	7590	460	7803	473	8017	485	8213	497	8410
448	7607	461	7820	474	8033	486	8230	498	8427
449	7623	462	7836	475	8049	487	8246	499	8443
450	7641	463	7853	476	8066	488	8263	500	8459
451	7656	464	7869	477	8082	489	8279	501	8477
452	7672	465	7885						

X = Average of Two 5-Minute Walk Egg Mass Counts.

Y = Estimated Egg Masses Per Acre.

$$Y = 16.40 (X) + 259.44$$

$$R^2 = 0.81$$

Criteria:

Use this Table (Equation) during the third year of an outbreak. The area should have experienced two consecutive years of heavy defoliation. There are more old than new egg masses in the area, and the new egg masses are generally very small (the size of a U.S. dime or smaller). This Table (Equation) is most accurate for X values between 40 and 230.

Table 5. Overstory Egg Masses per Acre Estimate Based on a Basal Area Factor Twenty Prism.

Limiting Distance (ft.)	Dbh (in.)	Egg Mass Count							
		1	2	3	4	5	6	7	8
3.9	2	917	1834	2750	3667	4584	5501	6417	7334
5.8	3	407	815	1222	1630	2037	2445	2852	3260
7.8	4	229	458	688	917	1146	1375	1604	1834
9.7	5	147	293	440	587	733	880	1027	1173
11.7	6	102	204	306	407	509	611	713	815
13.6	7	75	150	225	299	374	449	524	599
15.6	8	57	115	172	229	286	344	401	458
17.5	9	45	91	136	181	226	272	317	362
19.4	10	37	73	110	147	183	220	257	293
21.4	11	30	61	91	121	152	182	212	242
23.3	12	25	51	76	102	127	153	178	204
25.3	13	22	43	65	87	108	130	152	174
27.2	14	19	37	56	75	94	112	131	150
29.2	15	16	33	49	65	81	98	114	130
31.1	16	14	29	43	57	72	86	100	115
33.1	17	13	25	38	51	63	76	89	102
35.0	18	11	23	34	45	57	68	79	91
36.9	19	10	20	30	41	51	61	71	81
38.8	20	9	18	28	37	46	55	64	73
40.7	21	8	17	25	33	42	50	58	67
42.8	22	8	15	23	30	38	45	53	61
44.7	23	7	14	21	28	35	42	49	55
46.7	24	6	13	19	25	32	38	45	51
48.6	25	6	12	18	23	29	35	41	47
50.6	26	5	11	16	22	27	33	38	43
52.5	27	5	10	15	20	25	30	35	40
54.4	28	5	9	14	19	23	28	33	37
56.4	29	4	9	13	17	22	26	31	35
58.3	30	4	8	12	16	20	24	29	33
60.3	31	4	8	11	15	19	23	27	31
62.2	32	4	7	11	14	18	21	25	29
64.2	33	3	7	10	13	17	20	24	27
66.1	34	3	6	10	13	16	19	22	25
68.1	35	3	6	9	12	15	18	21	24
70.0	36	3	6	8	11	14	17	20	23
71.9	37	3	5	8	11	13	16	19	21
73.9	38	3	5	8	10	13	15	18	20
75.8	39	2	5	7	10	12	14	17	19

Egg Mass Count

Dbh (in.)	9	10	11	12	13	14	15	16	17	18
2	8251	9168								
3	3667	4074	4482	4889	5297	5704	6112	6519	6927	7334
4	2063	2292	2521	2750	2979	3209	3438	3667	3896	4125
5	1320	1467	1613	1760	1907	2054	2200	2347	2494	2640
6	917	1019	1120	1222	1324	1426	1528	1630	1732	1833
7	674	748	823	898	973	1048	1123	1197	1272	1347
8	516	573	630	688	745	802	859	917	974	1031
9	407	453	498	543	589	634	679	724	770	815
10	330	367	403	440	477	513	550	587	623	660
11	273	303	333	364	394	424	455	485	515	546
12	229	255	280	306	331	357	382	407	433	458
13	195	217	239	260	282	304	325	347	369	391
14	168	187	206	225	243	262	281	299	318	337
15	147	163	179	196	212	228	244	261	277	293
16	129	143	158	172	186	201	215	229	244	258
17	114	127	140	152	165	178	190	203	216	228
18	102	113	124	136	147	158	170	181	192	204
19	91	102	112	122	132	142	152	163	173	183
20	83	92	101	110	119	128	138	147	156	165
21	75	83	91	100	108	116	125	133	141	150
22	68	76	83	91	98	106	114	121	129	136
23	62	69	76	83	90	97	104	111	118	125
24	57	64	70	76	83	89	95	102	108	115
25	53	59	65	70	76	82	88	94	100	106
26	49	54	60	65	71	76	81	87	92	98
27	45	50	55	60	65	70	75	80	86	91
28	42	47	51	56	61	65	70	75	80	84
29	39	44	48	52	57	61	65	70	74	78
30	37	41	45	49	53	57	61	65	69	73
31	34	38	42	46	50	53	57	61	65	69
32	32	36	39	43	47	50	54	57	61	64
33	30	34	37	40	44	47	51	54	57	61
34	29	32	35	38	41	44	48	51	54	57
35	27	30	33	36	39	42	45	48	51	54
36	25	28	31	34	37	40	42	45	48	51
37	24	27	29	32	35	38	40	43	46	48
38	23	25	28	30	33	36	38	41	43	46
39	22	24	27	29	31	34	36	39	41	43

Egg Mass Count

Dbh (in.)	19	20	21	22	23	24	25	26	27
2									
3	7741	8149	8556	8964	9371	9779			
4	4355	4584	4813	5042	5271	5501	5730	5959	6188
5	2787	2934	3080	3227	3374	3520	3667	3814	3960
6	1935	2037	2139	2241	2343	2445	2574	2648	2750
7	1422	1497	1572	1646	1721	1796	1871	1946	2021
8	1089	1146	1203	1261	1318	1375	1432	1490	1547
9	860	905	951	996	1041	1087	1132	1177	1222
10	697	733	770	807	843	880	917	953	990
11	576	606	636	667	697	727	758	788	818
12	484	509	535	560	586	611	637	662	688
13	412	434	456	477	499	521	542	564	586
14	355	374	393	412	430	449	468	486	505
15	310	326	342	359	375	391	407	424	440
16	272	286	301	315	329	344	358	372	387
17	241	254	266	279	292	305	317	330	343
18	215	226	238	249	260	272	283	294	306
19	193	203	213	223	234	244	254	264	274
20	174	183	193	202	211	220	229	238	248
21	158	166	175	183	191	200	208	216	225
22	144	152	159	167	174	182	189	197	205
23	132	139	146	153	159	166	173	180	187
24	121	127	134	140	146	153	159	166	172
25	111	117	123	129	135	141	147	153	158
26	103	108	114	119	125	130	136	141	146
27	96	101	106	111	116	121	126	131	136
28	89	94	98	103	108	112	117	122	126
29	83	87	92	96	100	105	109	113	118
30	77	81	86	90	94	98	102	106	110
31	73	76	80	84	88	92	95	99	103
32	68	72	75	79	82	86	90	93	97
33	64	67	71	74	77	81	84	88	91
34	60	63	67	70	73	76	79	82	86
35	57	60	63	66	69	72	75	78	81
36	54	57	59	62	65	68	71	74	76
37	51	54	56	59	62	64	67	70	72
38	48	51	53	56	58	61	63	66	69
39	46	48	51	53	55	58	60	63	65

Egg Mass Count

Dbh (in.)	28	29	30	31	32	33	34	35	36
2									
3									
4	6417	6646	6876	7105	7334	7563	7792	8022	8251
5	4107	4254	4400	4547	4694	4840	4987	5134	5280
6	2852	2954	3056	3158	3260	3361	3463	3565	3667
7	2095	2170	2245	2320	2395	2470	2544	2619	2694
8	1604	1662	1719	1776	1834	1891	1948	2005	2063
9	1268	1313	1358	1403	1449	1494	1539	1585	1630
10	1027	1063	1100	1137	1173	1210	1247	1283	1320
11	849	879	909	939	970	1000	1030	1061	1091
12	713	738	764	789	815	840	866	891	917
13	608	629	651	673	694	716	738	759	781
14	524	543	561	580	599	617	636	655	674
15	456	473	489	505	522	538	554	570	587
16	401	415	430	444	458	473	487	501	516
17	355	368	381	393	406	419	431	444	457
18	317	328	340	351	362	373	385	396	407
19	284	295	305	315	325	335	345	356	366
20	257	266	275	284	293	303	312	321	330
21	233	241	249	258	266	274	283	291	299
22	212	220	227	235	242	250	258	265	273
23	194	201	208	215	222	229	236	243	250
24	178	185	191	197	204	210	216	223	229
25	164	170	176	182	188	194	199	205	211
26	152	157	163	168	174	179	184	190	195
27	141	146	151	156	161	166	171	176	181
28	131	136	140	145	150	154	159	164	168
29	122	126	131	135	140	144	148	153	157
30	114	118	122	126	130	134	139	143	147
31	107	111	114	118	122	126	130	134	137
32	100	104	107	111	115	118	122	125	129
33	94	98	101	104	108	111	114	118	121
34	89	92	95	98	102	105	108	111	114
35	84	87	90	93	96	99	102	105	108
36	79	82	85	88	91	93	96	99	102
37	75	78	80	83	86	88	91	94	96
38	71	74	76	79	81	84	86	89	91
39	68	70	72	75	77	80	82	84	87

Egg Mass Count

Dbh (in.)	37	38	39	40	41	42	43	44	45
2									
3									
4	8480	8709	8938	9168	9397	9626	9855		
5	5427	5574	5721	5867	6014	6161	6307	6454	6601
6	3769	3871	3973	4074	4176	4278	4380	4482	4584
7	2769	2844	2919	2993	3068	3143	3218	3293	3368
8	2120	2177	2235	2292	2349	2406	2464	2521	2578
9	- 1675	1720	1766	1811	1856	1901	1947	1992	2037
10	1357	1393	1430	1467	1503	1540	1577	1613	1650
11	1121	1152	1182	1212	1243	1273	1303	1333	1364
12	942	968	993	1019	1044	1070	1095	1120	1146
13	803	825	846	868	890	911	933	955	976
14	692	711	730	748	767	786	804	823	842
15	603	619	636	652	668	685	701	717	733
16	530	544	559	573	587	602	616	630	645
17	469	482	495	508	520	533	546	558	571
18	419	430	441	453	464	475	487	498	509
19	376	386	396	406	416	427	437	447	457
20	339	348	358	367	376	385	394	403	413
21	308	316	324	333	341	349	358	366	374
22	280	288	295	303	311	318	326	333	341
23	256	263	270	277	284	291	298	305	312
24	236	242	248	255	261	267	274	280	286
25	217	223	229	235	241	246	252	258	264
26	201	206	212	217	222	228	233	239	244
27	186	191	196	201	206	211	216	221	226
28	173	178	182	187	192	196	201	206	210
29	161	166	170	174	179	183	187	192	196
30	151	155	159	163	167	171	175	179	183
31	141	145	149	153	156	160	164	168	172
32	132	136	140	143	147	150	154	158	161
33	125	128	131	135	138	141	145	148	152
34	117	121	124	127	130	133	136	140	143
35	111	114	117	120	123	126	129	132	135
36	105	108	110	113	116	119	122	124	127
37	99	102	104	107	110	113	115	118	121
38	94	96	99	102	104	107	109	112	114
39	89	92	94	96	99	101	104	106	108

Egg Mass Count

Dbh (in.)	46	47	48	49	50	55	60	65	70
2									
3									
4									
5	6747	6894	7041	7187	7334	8067	8801	9534	
6	4686	4787	4889	4991	5093	5602	6112	6621	7130
7	3442	3517	3592	3667	3742	4116	4490	4864	5239
8	2636	2693	2750	2808	2865	3151	3438	3724	4011
9	2082	2128	2173	2218	2264	2490	2716	2943	3169
10	1687	1723	1760	1797	1834	2017	2200	2384	2567
11	1394	1424	1455	1485	1515	1667	1818	1970	2121
12	1171	1197	1222	1248	1273	1401	1528	1655	1783
13	998	1020	1042	1063	1085	1193	1302	1410	1519
14	861	879	898	917	935	1029	1123	1216	1310
15	750	766	782	799	815	896	978	1059	1141
16	659	673	688	702	716	788	859	931	1003
17	584	596	609	622	634	698	761	825	888
18	521	532	543	555	566	622	679	736	792
19	467	477	488	498	508	559	609	660	711
20	422	431	440	449	458	504	550	596	642
21	382	391	399	407	416	457	499	540	582
22	349	356	364	371	379	417	455	492	530
23	319	326	333	340	347	381	416	451	485
24	293	299	306	312	318	350	382	414	446
25	270	276	282	287	293	323	352	381	411
26	250	255	260	266	271	298	325	353	380
27	231	236	241	246	252	277	302	327	352
28	215	220	225	229	234	257	281	304	327
29	201	205	209	214	218	240	262	283	305
30	187	191	196	200	204	224	244	265	285
31	176	179	183	187	191	210	229	248	267
32	165	168	172	175	179	197	215	233	251
33	155	158	162	165	168	185	202	219	236
34	146	149	152	155	159	174	190	206	222
35	138	141	144	147	150	165	180	195	210
36	130	133	136	139	141	156	170	184	198
37	123	126	129	131	134	147	161	174	188
38	117	119	122	124	127	140	152	165	178
39	111	113	116	118	121	133	145	157	169

Egg Mass Count

Dbh (in.)	75	80	85	90	95	100	105	110	115
2									
3									
4									
5									
6	7640	8149	8658	9167	9677				
7	5613	5987	6361	6735	7109				
8	4297	4584	4870	5157	5443	7484	7858	8232	8606
9	3395	3622	3848	4074	4301	4527	4754	4980	5206
10	2750	2934	3117	3300	3484	3667	3850	4034	4217
11	2273	2424	2576	2728	2879	3031	3182	3334	3485
12	1910	2037	2165	2292	2419	2547	2674	2801	2929
13	1627	1736	1844	1953	2061	2170	2278	2387	2495
14	1403	1497	1590	1684	1777	1871	1964	2058	2152
15	1222	1304	1385	1467	1548	1630	1711	1793	1874
16	1074	1146	1218	1289	1361	1432	1504	1576	1647
17	952	1015	1079	1142	1205	1269	1332	1396	1459
18	849	905	962	1019	1075	1132	1188	1245	1302
19	762	813	863	914	965	1016	1067	1117	1168
20	688	733	779	825	871	917	963	1008	1054
21	624	665	707	748	790	832	873	915	956
22	568	606	644	682	720	758	796	833	871
23	520	555	589	624	659	693	728	763	797
24	477	509	541	573	605	637	668	700	732
25	440	469	499	528	557	587	616	645	675
26	407	434	461	488	515	542	570	597	624
27	377	402	428	453	478	503	528	553	578
28	351	374	398	421	444	468	491	515	538
29	327	349	371	392	414	436	458	480	501
30	306	326	346	367	387	407	428	448	469
31	286	305	324	343	363	382	401	420	439
32	269	286	304	322	340	358	376	394	412
33	253	269	286	303	320	337	354	370	387
34	238	254	270	285	301	317	333	349	365
35	225	239	254	269	284	299	314	329	344
36	212	226	241	255	269	283	297	311	325
37	201	214	228	241	254	268	281	295	308
38	190	203	216	229	241	254	267	279	292
39	181	193	205	217	229	241	253	265	277

Egg Mass Count

Dbh (in.)	120	125	130	135	140	145	150	155	160
2									
3									
4									
5									
6									
7	8980	9355	9729						
8	6876	7162	7449	7735	8022	8308	8595	8881	9168
9	5433	5659	5885	6112	6338	6564	6791	7017	7243
10	4400	4584	4767	4950	5134	5317	5501	5684	5867
11	3637	3788	3940	4091	4243	4394	4546	4697	4849
12	3056	3183	3310	3438	3565	3692	3820	3947	4074
13	2604	2712	2821	2929	3038	3146	3255	3363	3472
14	2245	2339	2432	2526	2619	2713	2806	2900	2993
15	1956	2037	2119	2200	2282	2363	2445	2526	2608
16	1719	1791	1862	1934	2005	2077	2149	2220	2292
17	1523	1586	1650	1713	1776	1840	1903	1967	2030
18	1358	1415	1471	1528	1585	1641	1698	1754	1811
19	1219	1270	1321	1371	1422	1473	1524	1574	1625
20	1100	1146	1192	1238	1283	1329	1375	1421	1467
21	998	1039	1081	1123	1164	1206	1247	1289	1330
22	909	947	985	1023	1061	1099	1136	1174	1212
23	832	866	901	936	970	1005	1040	1074	1109
24	764	796	828	859	891	923	955	987	1019
25	704	733	763	792	821	851	880	909	939
26	651	678	705	732	759	787	814	841	868
27	604	629	654	679	704	729	755	780	805
28	561	585	608	631	655	678	702	725	748
29	523	545	567	589	610	632	654	676	698
30	489	509	530	550	570	591	611	632	652
31	458	477	496	515	534	553	572	591	611
32	430	448	466	483	501	519	537	555	573
33	404	421	438	455	471	488	505	522	539
34	381	397	412	428	444	460	476	492	508
35	359	374	389	404	419	434	449	464	479
36	340	354	368	382	396	410	424	439	453
37	321	335	348	362	375	388	402	415	429
38	305	317	330	343	356	368	381	394	406
39	289	301	313	325	338	350	362	374	386

Egg Mass Count

Dbh (in.)	165	170	175	180	185	190	195	200	205
2									
3									
4									
5									
6									
7									
8	9454	9740							
9	7470	7696	7923	8149	8375	8602	8828	9054	9281
10	6051	6234	6417	6601	6784	6967	7151	7334	7517
11	5000	5152	5304	5455	5607	5758	5910	6061	6213
12	4202	4329	4456	4584	4711	4838	4966	5093	5220
13	3580	3689	3797	3906	4014	4123	4231	4340	4448
14	3087	3181	3274	3368	3461	3555	3648	3742	3835
15	2689	2771	2852	2934	3015	3097	3178	3260	3341
16	2363	2435	2507	2578	2650	2722	2793	2865	2936
17	2094	2157	2221	2284	2347	2411	2474	2538	2601
18	1867	1924	1981	2037	2094	2150	2207	2264	2320
19	1676	1727	1778	1828	1879	1930	1981	2032	2082
20	1513	1558	1604	1650	1696	1742	1788	1834	1879
21	1372	1414	1455	1497	1538	1580	1621	1663	1705
22	1250	1288	1326	1364	1402	1440	1477	1515	1553
23	1144	1178	1213	1248	1282	1317	1352	1386	1421
24	1050	1082	1114	1146	1178	1210	1241	1273	1305
25	968	997	1027	1056	1085	1115	1144	1173	1203
26	895	922	949	976	1004	1031	1058	1085	1112
27	830	855	880	905	931	956	981	1006	1031
28	772	795	819	842	865	889	912	935	959
29	719	741	763	785	807	828	850	872	894
30	672	693	713	733	754	774	795	815	835
31	630	649	668	687	706	725	744	763	782
32	591	609	627	645	662	680	698	716	734
33	556	572	589	606	623	640	657	673	690
34	523	539	555	571	587	603	619	634	650
35	494	509	524	539	554	569	584	599	614
36	467	481	495	509	523	538	552	566	580
37	442	455	469	482	496	509	522	536	549
38	419	432	444	457	470	482	495	508	521
39	398	410	422	434	446	458	470	482	494

Egg Mass Count

h (in.)	210	215	220	225	230	235	240	245	250
2									
3									
4									
5									
6									
7									
8									
9	9507	9733	9960						
10	7701	7884	8067	8251	8434	8617	8801	8984	9168
11	6364	6516	6667	6819	6970	7122	7273	7425	7576
12	5348	5475	5602	5730	5857	5984	6112	6239	6366
13	4557	4665	4774	4882	4991	5099	5208	5316	5425
14	3929	4022	4116	4210	4303	4397	4490	4584	4677
15	3423	3504	3586	3667	3748	3830	3911	3993	4074
16	3008	3080	3151	3223	3295	3366	3438	3509	3581
17	2665	2728	2791	2855	2918	2982	3045	3109	3172
18	2377	2433	2490	2547	2603	2660	2716	2773	2829
19	2133	2184	2235	2286	2336	2387	2438	2489	2539
20	1925	1971	2017	2063	2109	2154	2200	2246	2292
21	1746	1788	1829	1871	1912	1954	1996	2037	2079
22	1591	1629	1667	1705	1743	1780	1818	1856	1894
	1456	1490	1525	1560	1594	1629	1664	1698	1733
24	1337	1369	1401	1432	1464	1496	1528	1560	1592
25	1232	1261	1291	1320	1349	1379	1408	1437	1467
26	1139	1166	1193	1221	1248	1275	1302	1329	1356
27	1056	1081	1107	1132	1157	1182	1207	1232	1258
28	982	1066	1029	1052	1076	1099	1123	1146	1169
29	916	937	959	981	1003	1025	1046	1068	1090
30	856	876	896	917	937	957	978	998	1019
31	801	820	839	859	878	897	916	935	954
32	752	770	788	806	824	842	859	877	895
33	707	724	741	758	774	791	808	825	842
34	666	682	698	714	730	745	761	777	793
35	629	644	659	674	688	703	718	733	748
36	594	608	622	637	651	665	679	693	707
37	563	576	589	603	616	629	643	656	670
38	533	546	559	571	584	597	609	622	635
39	506	518	530	542	555	567	579	591	603

APPENDIX

This appendix contains two examples using the egg mass survey techniques. In addition, a blank survey form is included.

Example No. 1 had an average of two 5-minute walk EMC's of less than 40. The variable- and fixed radius plot method, using five BAF-20 prism points, resulted in an estimate of 376 EM/A. It was noticed that a change in the forest stand composition occurred after Plot 4 with more oaks occurring in Plots 5-10. Plots 1 to 4 did not experience heavy defoliation (0 to 25%), but trees in Plot 5 suffered heavy defoliation (40 to 100%).

Example No. 2 shows the results of two 5-minute walk EMC's with an average greater than 40. Plots 6 to 10 are a continuation of the line of plots presented in example No. 1, and illustrates the point that by doing a number of 5-minute walk EMC's in an area survey crews can determine the extent of a gypsy moth outbreak. Plots 6 to 10 had an estimated 1018 EM/A using Table 2 and the 5-minute walk EMC method. In comparison, the variable- and fixed-radius plot method yielded an estimate of 843 EM/A. This area suffered heavy defoliation (50 to 100%).

These two examples were chosen to illustrate the point that the 5-minute walk EMC or a number of 5-minute walk EMC's in an area can help determine the borders of a gypsy moth infestation and assist the field crew in establishing potential treatment areas.

EXAMPLE NO. 1

GYPSY MOTH EGG MASS SURVEY

COUNTY Orange Co., N.Y. PESTICIDE _____
BLOCK LOCATION W.Mombasha Rd. DATE SPRAYED _____
BLOCK NO. Check Plots #1-5 NO. ACRES SPRAYED _____

STEP 1: 5-Minute Walk Egg Mass Counts (EMC) 4/3/80

COUNT 1 = -Don

$\begin{array}{r} + \\ \text{COUNT 2} = \end{array}$ -Larry

SUM \div 2 = AVERAGE OF TWO 5-MINUTE WALK EMC'S

If the average of the two 5-minute walk EMC'S is \geq 40, then use tables 1-4 to estimate egg masses per acre (EM/A).

Table Used =

EM/A =

If the average is $<$ 40, then complete Step 2 on the reverse side.

NOTE: If block is sprayed, then cols. 2, 3, 10 and 11 on the reverse side should be completed.

Comments: egg masses are very large; little to no defoliation in 1979; no old egg masses visible. Most of the egg masses in the 5-minute walk were counted during the last minute of the walk. Note that the line of plots is on the border of the outbreak area. Plots 1-4 are in a mixed hardwoods area, which changes to an all oak stand in Plots 5-10. The defoliation results and numbers of egg masses illustrate this change.

EXAMPLE NO. 1

STEP 2: Variable- and Fixed-Radius Plots (Min. of 3 BAF20 Prism Points)

WORK DATES:		4/3/80 Don Larry							6/26 1980 Don			
2	3	4	5	6	7	8	9	10	11	12		
Plot No.	Tree Sp.	DBH (in)	PRE-spray EMC	PRE-spray EM/A	8.3 ft. EMC	POST-spray EMC	POST-spray EM/A	8.3 ft. EMC	% DEF I	% DEF II	COMMENTS	
1	Hick	10	1	37					10		Plots 1-4 not heavily defoliated (avg=14%)	
	CO	11	0	0	0				25			
	Hick	9	0	0					5			
	RO	17	0	0					20			
2	RO	13	0	0					20		EM/A estimate for Plots 1-4 is 205 EM/A.	
	Ash	15	1	16	0				15			
	RO	13	0	0					0			
	Hick	8	1	57					10			
3	BO	12	1	25					20		Oak Defol in Plots 1-4 is 19%.	
	RO	7	0	0	1				10			
	RO	9	0	0					15			
	CO	11	1	30					20			
4	Hick	13	1	22					25		Non-oak Defol in Plots 1-4 is 7%.	
	Hick	8	1	57	0				10			
	Hick	7	1	75					10			
	Hick	6	0	0					5			
SUM	CO	8	2	115					25		Plots 5-10 are heavily defoliated. Plot 5 Defol is 71%.	
	Hick	5	1	147					5			
	RO	14	2	37	0				50			
	CO	9	1	45					50			
	RO	14	2	37					100			
	RO	14	11	206					95			
	CO	7	5	374					40			
	CO	9	8	362					90			
	SUM			1679	1	SUM				Avg Defol=27%		

EM/A estimates in cols. 5 and 8 are determined from Table 5 by using data in cols. 3-4 and 3-7, respectively.

Prespray overstory EM/A = SUM Col. 5 ÷ No. of prism points.

$$\boxed{336} = \boxed{1679} \div \boxed{5}$$

Prespray understory EM/A = (SUM Col. 6 ÷ No. of prism points) x 200

$$\boxed{40} = \left(\boxed{1} \div \boxed{5} \right) \times 200$$

NOTE: One 8.3 ft. radius miniplot EMC required for each prism point.
Total prespray EM/A estimate = overstory EM/A + understory EM/A

$$\boxed{376} = \boxed{336} + \boxed{40}$$

% Def I = Defoliation estimate at time of spraying.

% Def II = Defoliation estimate at end of larval feeding.

EXAMPLE NO. 2

GYPSY MOTH EGG MASS SURVEY

COUNTY Orange Co., N.Y. PESTICIDE _____
BLOCK LOCATION W.Mombasha Rd. DATE SPRAYED _____
BLOCK NO. Check Plots #6-10 NO. ACRES SPRAYED _____

STEP 1: 5-Minute Walk Egg Mass Counts (EMC) 4/3/80

COUNT 1 = 57 -Don
COUNT 2 = 62 -Larry
SUM 119 \div 2 = 60 AVERAGE OF TWO 5-MINUTE WALK EMC'S

If the average of the two 5-minute walk EMC'S is ≥ 40 , then use tables 1-4 to estimate egg masses per acre (EM/A).

Table Used = 2 EM/A = 1018

If the average is < 40 , then complete Step 2 on the reverse side.

NOTE: If block is sprayed, then cols. 2, 3, 10 and 11 on the reverse side should be completed.

Comments: Little or no defoliation in 1979; egg masses are very large (greater than size of a U.S. quarter); cannot find any old egg masses; little or no egg parasitism (cannot see any exit holes in egg masses). The estimated EM/A using the variable- and fixed-radius plot method with 5 BAF-20 prism points was 843 EM/A.

EXAMPLE NO. 2

STEP 2: Variable- and Fixed-Radius Plots (Min. of 3 BAF20 Prism Points)

WORK DATES:			4/3/80 Don Larry						6/26 1980		-Don
1	2	3	4	5	6	7	8	9	10	11	12
Plot No.	Tree Sp.	DBH (in)	PRE-spray EMC	PRE-spray EM/A	8.3 ft. EMC	POST-spray EMC	POST-spray EM/A	8.3 ft. EMC	% DEF I	% DEF II	COMMENTS
6	CO	8								100	Plots 6-10 are heavily defoliated.
	BO	15								95	
	CO	10								85	
	RO	13								50	
	RO	14								50	
7	CO	16								100	
	CO	13								100	
8	CO	6								85	
	WO	13								100	
	WO	6								100	
	SO	10								95	
	CO	15								100	
9	CO	11								100	
	RM	5								100	
	CO	9								95	
	BO	14								100	
	CO	8								100	
10	RO	15								90	
	CO	12								100	
	CO	7								100	
	CO	5								100	
	RO	14								100	
CO	10								100		
			SUM			SUM			Avg Defol = 93%		

EM/A estimates in cols. 5 and 8 are determined from Table 5 by using data in cols. 3-4 and 3-7, respectively.

Prespray overstory EM/A = $\text{SUM Col. 5} \div \text{No. of prism points}$.

$$\boxed{} = \boxed{} \div \boxed{}$$

Prespray understory EM/A = $(\text{SUM Col. 6} \div \text{No. of prism points}) \times 200$

$$\boxed{} = (\boxed{} \div \boxed{}) \times 200$$

NOTE: One 8.3 ft. radius miniplot EMC required for each prism point.
Total prespray EM/A estimate = overstory EM/A + understory EM/A

$$\boxed{} = \boxed{} + \boxed{}$$

Def I = Defoliation estimate at time of spraying.

% Def II = Defoliation estimate at end of larval feeding.

STEP 2: Variable- and Fixed-Radius Plots (Min. of 3 BAF20 Prism Points)

WORK DATES:											
1	2	3	4	5	6	7	8	9	10	11	12
Plot No.	Tree Sp.	DBH (in)	PRE-spray EMC	PRE-spray EM/A	8.3 ft. EMC	POST-spray EMC	POST-spray EM/A	8.3 ft. EMC	% DEF I	% DEF II	COMMENTS
			SUM			SUM					

EM/A estimates in cols. 5 and 8 are determined from Table 5 by using data in cols. 3-4 and 3-7, respectively.

Prespray overstory EM/A = SUM Col. 5 ÷ No. of prism points.

= ÷

Prespray understory EM/A = (SUM Col. 6 ÷ No. of prism points) x 200

= (÷) x 200

NOTE: One 8.3 ft. radius miniplot EMC required for each prism point.
 Total prespray EM/A estimate = overstory EM/A + understory EM/A

= +

% Def I = Defoliation estimate at time of spraying.
 % Def II = Defoliation estimate at end of larval feeding.

GYPSY MOTH EGG MASS SURVEY

COUNTY _____ PESTICIDE _____
BLOCK LOCATION _____ DATE SPRAYED _____
BLOCK NO. _____ NO. ACRES SPRAYED _____

STEP 1: 5-Minute Walk Egg Mass Counts (EMC)

COUNT 1 =

$+$
COUNT 2 =

SUM \div 2 = AVERAGE OF TWO 5-MINUTE WALK EMC'S

If the average of the two 5-minute walk EMC'S is ≥ 40 , then use tables 1-4 to estimate egg masses per acre (EM/A).

Table Used =

EM/A =

If the average is < 40 , then complete Step 2 on the reverse side.

NOTE: If block is sprayed, then cols. 2, 3, 10 and 11 on the reverse side should be completed.