

Protocol for Carbaryl Spray Trials

I. Objectives: To establish and characterize aerial application parameters required for a potential Gypsy Moth eradication effort.

II. Monitoring Plan:

The spray trials will be under the overall supervision of Ronald J. Oshima, Environmental Hazards Assessment Program (EHAP). Phone (916) 322-2395 or ATSS 492-2395. Key personnel participating from EHAP CDFA are listed below:

Tom Mischke - Responsible for selection of sampling methodology, field storage and transport of collected samples, and liaison to CDFA Chemistry Laboratory Services for questions concerning all aspects of the chemical analysis of collected samples. Phone (916) 322-2395 or ATSS 492-2395.

Don Weaver - Responsible for the study design, supervision over sample collection and data reduction. Phone (916) 322-2395 or ATSS 492-2395.

Study Design:

A. The spray trials are designed to produce data enabling an estimation, at different elevations, of the following parameters:

- application swath width
- deposition rate
- particle size distribution
- canopy penetration

Later sections of this protocol will address each of these topics.

B. Application:

1. Sevin XLR will be applied at the rate of 1 qt. per acre.
2. Flights will be made at 2 altitudes, 50 ft and 250 ft.
3. The helicopter configuration for 50' will be 46-54 8004 nozzles, 60 psi, and 75 mph.
4. The helicopter configuration for 250' will be selected from 8008 or 8010 nozzles at 30 psi.
5. Rhodamine dye will be added to the formulation to allow automated drop-let quantification.

C. Study Timetable

1. Sampling will occur on two separate days. Swath width will be determined on the second day, and all other parameters on the first day.

2. A sampling day will encompass the period from sunrise to 11:00 am and will be terminated if winds are judged to be too severe.

III. Sampling Design

A. Swath Width

1. A sampling line will be established for 1000 ft with 10 ft intervals between sites.
2. For the 50' flight, plastic backed absorbant paper sheets (1 sq.ft.) will be placed at 20' intervals for 400', and analyzed to determine mass/area. Kromekote cards will be placed at 10' intervals for 400', and analyzed to determine particle sizes and numbers.
3. For the 250' flight, the absorbant paper will be placed at 20' intervals for 1000', and the Kromekote cards at 10' intervals for 1000'.
4. All flights will be made directly into the wind.
5. A total of 70 fallout sheets and 140 Kromekote cards will be collected.

B. Deposition Rate

1. A 5 x 5 sampling site matrix will be established in a 14 acre spray area. Specific locations for each of the 25 sites will be determined by the spray area geography.
2. Two additional sites will be established downwind of the spray area.
3. A fallout sheet will be placed at each of the 27 sites just prior to spraying, and collected 30 min. after termination of the spray operation.
4. A total of 54 fallout sheets will be collected, one half analyzed as priority samples.

C. Particle Size Distribution

1. A Kromekote card will be placed at each of the 27 sites just prior to spraying, and collected 30 min. after termination of the spray operation.
2. Five sites will be established for high volume air samplers (40 cfm), three within the spray area and two downwind of the spray area.
3. Each of these five sites will have three air samplers. One sampler will be equipped with a dual stage cascade impactor to quantify % mass and size distribution of airborne particles greater than and less than 3.5 microns. A second Hi-Vol will collect total suspended particulates on an 8 x 10 glass fiber filter. The third Hi-Vol will collect gas phase carbaryl on XAD-2 resin.

4. Background resin samples will be collected prior to the first and second sprays for 40 minutes.
5. All samplers will run during each spray operation and for 30 minutes after each spray.
6. A total of 27 Kromekote cards, 22 resin jars, and 30 glass fiber filters will be collected. The filter will be analyzed for dye content instead of carbaryl.

D. Canopy Penetration

1. A total of 140 fallout sheets, 140 Kromekote cards, and 12 leaf samples will be collected. The top panel of all boxes and the sprayed leaf samples will be analyzed as priority samples.
2. Three "tree" sites with understory and two "brush" sites will be chosen within the spray area to determine the amount of spray penetration for each altitude.

Boxes with plastic backed absorbant paper and Kromekote cards on the top and four sides will be used to collect pesticide spray.

One box will be placed near the top, middle and lower canopy of each mature tree and in the center of a clump of brush representing understory on the ground beneath each tree. A box will also be placed towards the center of two individual smaller trees representing brush sites.

3. Leaf samples (35-40 leaves) will be collected from one site each in the top, middle and lower canopy of mature trees. Fresh weight of samples will be determined and leaves will be analyzed for the amount of dislodgable pesticide per unit area.

IV. Handling and Storage of Samples

A sampling media and containers will be prepared and prenumbered at the CDFA laboratories in Sacramento. Each device will be shipped to the sampling sites with an accompanying Chain of Custody Record. The Chain of Custody Record will be filled out by all parties handling or storing the sampling media or sample containers from the time they leave the lab until they are returned for analysis.

All samples will be collected 30 min. after the termination of each flight and stored in the following manner:

On Dry Ice (-70°C)

Fallout samples
Air samples

On Ice (4°C)

Leaf Samples
Water Samples
Tank Samples

EXPECTED RESULTS FROM TRIAL

The following results would be available only if ideal conditions exist during the proposed carbaryl spray trials. These results would be obtained for each of the two application elevations.

1. An approximate expected swath width for each elevation. Cross sectional data in ug/sq ft and by particle #/size.
2. A quantification for ground level deposition rate in ug/sq ft and by particle #/size. This data would be present from within spray zone and two "downwind" drift points.
3. A quantification for the respirable airborne particle size distribution by mass. This data would be present from within the spray zone, and two "downwind" drift points.
4. A comparison of the pesticide mass settling on ground level and that mass depositing on canopy leaves.
5. Actual deposition rates per unit leaf area for three canopy types.

DAY 2 - Canopy & Grid Set-up

Don
Joe F.
Joey
Julie
Katie

Place canopy boxes
Notify Sheriff

Lee
Tom

Confirm Sevin delivery
Confirm helicopter
Review sample methodology

Randy
Muffet
Vince
Cindy
Joe P.

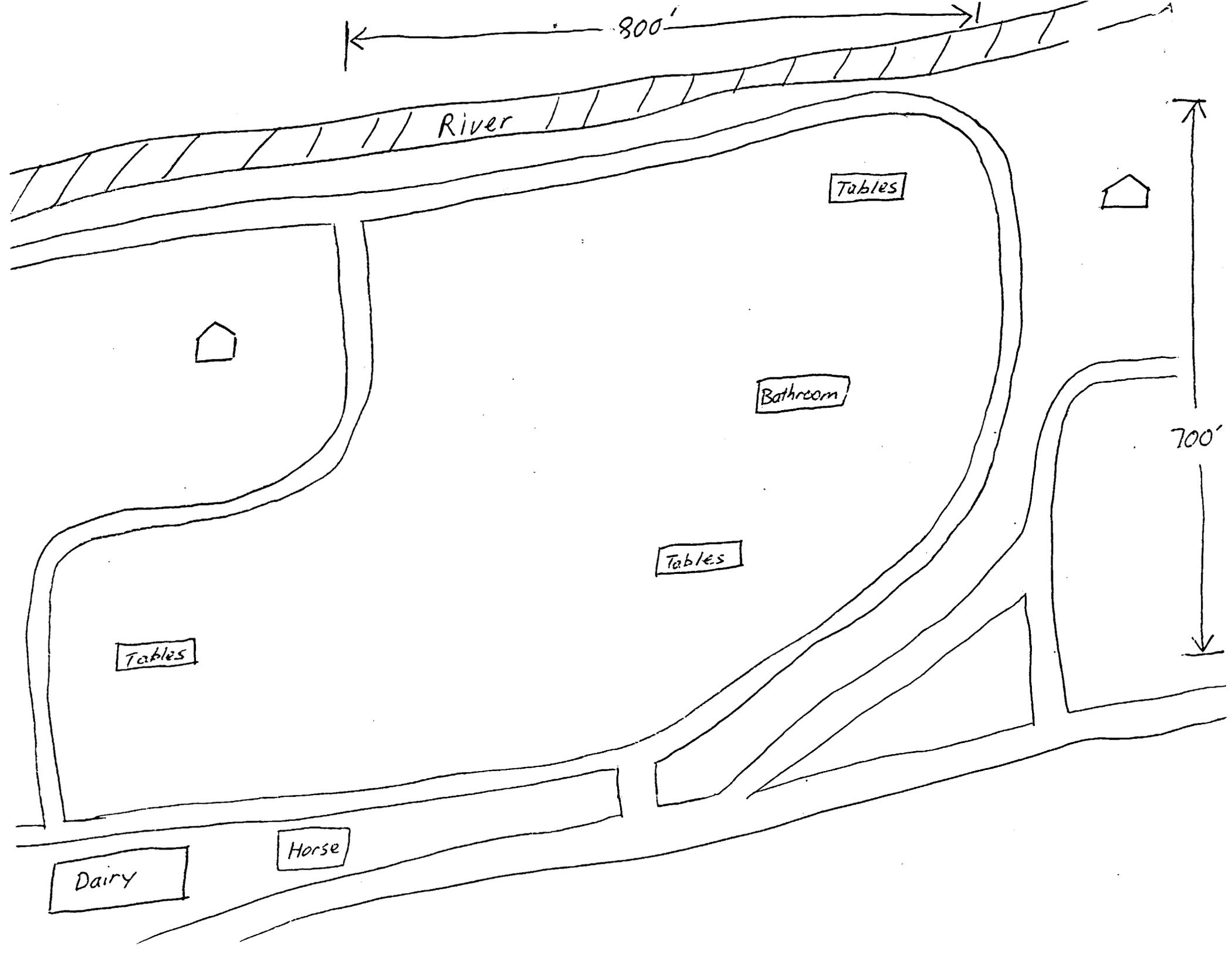
Establish grid
Establish location codes
Establish flight markers
Review timetable

Roger
Scott
Dave

Find Hi-Vol sites
Set-up weather station
Confirm notifications
Gas generators
Find car wash
Get wet ice

DAY 3 - Canopy & Grid Spray

	<u>AIR</u>	<u>CANOPY</u>	<u>GRID</u>	<u>OTHER</u>
	Roger Scott Fran <u>Dave</u>	Don Joe F. Joey Julie Katie <u>Joe P.</u>	Randy Muffet Vince <u>Cindy</u>	Lee <u>Tom</u>
0500-0600	Set-up Hi-Vols Run bkgd XAD			
0600-0655	Collect bkgd XAD Place XAD Place GFF Place cascade Place Kimbie Place UCD's	Remove bags	Place Kimbies Place UCD's	Take water bkgd Collect tank sampl Check weather sys- tem
0655-0700	Turn on Hi-Vols			
0700-0740		SPRAY 250'		Take weather readin
0740-0830	Collect XAD Collect GFF Collect cascade Collect Kimbie Collect UCD's	Collect boxes Tare leaf bottles Collect leaves Weigh leaves	Collect Kimbies Collect UCD's	Modify helicopter Collect tank sampl
0830-0910	Place XAD Place GFF Place cascade Place Kimbie Place UCD's Run bkgd XAD	Place boxes	Place Kimbies Place UCD's Move markers	
0910-0925	Collect XAD Place XAD Place open jar			
0925-0930	Collect open jar Turn on Hi-Vols			
0930-1010		SPRAY 50'		Take weather read- ing
1010-1100	Collect XAD Collect GFF Collect cascade Collect Kimbie Collect UCD's	Collect boxes Tare leaf bottles Collect leaves Weigh leaf bottles	Collect Kimbies Collect UCD's	Collect water Collect total leaves
1100-1300		Collect equipment, check COC's		



Study #	Sample #	Sampler Date on				Sampler Date off				Collector	Cell Location Code		Spray	BSPF	* EO	Sample Type	Key																						
		Mo	Day	Yr.	Time on	Mo	Day	Yr.	Time off			Site																											
1 7				8 2				8 2																															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

Companion	Bad Sample																	Chemist	Priority																				
UCD/CDFA																																							
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80

1. Study # (1-4) - Filled in
2. Sample # (5-8) - Filled in
3. Date on/off (9-28) - Military time
4. Collector (29-30) - Initials
5. Location Code
(31) A=Air C=Canopy G=Grid S=Swath width
(32) Elevation 0=Ground 1=Low 2=Med. 3=High
(33-34) Site # - refer to map
6. Spray (35) - 50' or 250' 1 or 2
7. BSPF (36) - B=Background
S=Spray
P=Post-spray
8. *EO (37) - Face on canopy box 1-5
9. Sample Type (38-40)
CA#=Cascade stage FAL=Kimbie
GFF=Glass fiber filter UCD=UCD card
XAD=Resin LEA=Leaf
TAN=Tank
10. Companion (41-44) - sample # of another sample
11. Bad sample (45) - Yes/No
12. Leave 46-80 blank
13. Remarks
Which flight
Site description
14. Lab results
Circle carbaryl, cross out others.
Write dye analysis on all GFF's.
15. Signatures
If you put sample out sign in "Received by". If you collect sample sign in "Relinquished by", and initial Col 29-30.
16. Make sure data on all 3 copies.
17. Do not tear off pink copy.