PROTOCOL

SOIL AND SEDIMENT SURVEY TO MONITOR FOR ENDOSULFAN AND DCPA IN MONTEREY COUNTY

I. INTRODUCTION

Personnel from the California Department of Fish and Game (DFG) have found endosulfan to be ubiquitous in the aquatic organisms of the Moss Landing drainage area of Monterey County since 1980. DCPA has also been found in this drainage area as well as on or in crops grown throughout Monterey County. In response to these problems, personnel from the Environmental Hazards Assessment Program (EHAP) of the California Department of Food and Agriculture (CDFA) will conduct a study to examine a potential source of the contamination as well as determine the general distribution of endosulfan and DCPA in soils of the agricultural areas of Monterey County.

II. OBJECTIVES

1. Correlate endosulfan and DCPA residues in soil from agricultural fields with adjacent sediment samples collected along agricultural drains and sloughs of the Moss Landing drainage basin. From these data, it can then be determined if soil adjacent to agricultural drains is a probable source of endosulfan and DCPA residues in the drainage basin.

2. Conduct a survey of soil from fields in the agricultural areas of Monterey County to examine the extent of endosulfan and DCPA contamination in the county.

III. PERSONNEL

Field sampling and chemical analysis will be coordinated by Randall Segawa with the assistance of Joan Fleck. Experimental design and statistical analysis will be conducted by Lisa Ross.

ALL QUESTIONS CONCERNING THIS STUDY SHOULD BE DIRECTED TO MARY BROWN AT (916) 324-8916. ATSS 454-8916.

IV. STUDY DESIGN

Objective 1. Sample collection will be concentrated along the agricultural drains with fewer sampling sites along the sloughs. A total of 20 sampling sites will be selected and four samples will be collected from each site. Two samples will be collected from farm soil and two from the adjacent drain and analyzed for endosulfan I, II and sulfate, and DCPA. A correlation analysis of soil and sediment residue results will be run on the mean of these replicate samples for each compound. A significant correlation between soil and sediment concentrations would indicate that a probable cause of agricultural drain contamination was the pesticide residues adsorbed to soil particles eroded into the drainage basin. To determine the mass input from eroded soil, the Wind Erosion Equation can be used to ascertain the mass movement of soil in this area, and from concentration data the mass of pesticides entering the sloughs in this medium can be determined.

Objective 2. The soil survey will be conducted in the Salinas River Valley where there are roughly 25 township-range squares to be sampled. Three samples will be randomly collected from each square and analyzed for endosulfan I, II and sulfate, and DCPA. This survey will provide information

on the extent of endosulfan and DCPA contamination in these agricultural areas.

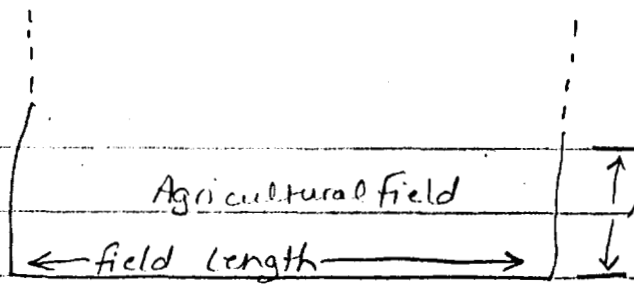
	Number of Samples
Objective 1	80
Objective 3	75
Quality Control	25
	180

V. STUDY TIMETABLE

Field site selection	November, 1986
Sampling complete	December, 1986
Chemical analysis complete	May, 1987
Draft report	August, 1987

10/22/86

Joan



Soil Samples should be taken at random from the ~~entire~~ 20m length of the field by 10m deep (length being the side of the field bordering the drain). From this area, 8 random plugs will be collected and placed in two sampling jars.

Sediment samples will be taken along a transect in the drain parallel to the field length in slow moving water or areas of sediment deposition. Eight random plugs will be collected at random from this transect and placed in two sampling jars.

When there are a number of fields to choose from at any one location, pick one at random. See attached a piece of a random numbers table to facilitate random point location.

For the Correlation analysis (objective #1)

Five ~~or six~~ Sampling sites will be located in the Elkhorn Slough drainage, including one coastal site at McCloskey Slough

One or two " site in the Moro Cojo Slough drainage

Nine " sites " " Tembladero " including Espinosa, Alisal

Four or five " " " " Alisal " "

20 TOTAL

58 60

2 Carmel

74

(134)

TABLE I. Twenty-five hundred random digits.

	1	2	3	4	5	6	7	8	9	10	
1	48461	14952	72619	73689	52059	37086	+60050	−86192	+67049	64739	1
2	76534	38149	49692	31366	52093	15422	+20498	+33901	+10319	43397	2
3	70437	25861	38504	14752	23757	59660	+67844	−78815	+23758	86814	3
4	59584	03370	42806	11393	71722	93804	−09095	−07856	+55589	46020	4
5	04285	58554	16085	51555	27501	73883	+33427	+33343	[illegible]07	50063	5
6	77340	10412	69189	85171	29082	44785	−83638	−02583	−96483	76553	6
7	59183	62687	91778	80354	23512	97219	+65921	−02035	+59847	91403	7
8	91800	04281	39979	03927	82564	28777	+59049	−97532	+54540	79472	8
9	12066	24817	81099	48940	69554	55925	+48379	+12866	+51232	21580	9
10	69907	91751	53512	23748	65906	91385	−84983	+27915	[illegible]491	91068	10
11	80467	04873	54053	25955	48518	13815	+37707	+68687	+15570	08890	11
12	78057	67835	28302	45048	56761	97725	+58438	−91528	+24645	18544	12
13	05648	39387	78191	88415	60269	94880	+58812	+42931	+71898	61534	13
14	22304	39246	01350	99451	61862	78688	+30339	+60222	+74052	25740	14
15	61346	50269	67005	40442	33100	16742	+61640	+21046	+31909	72641	15
16	66793	37696	27965	30459	91011	51426	[illegible]906	−77468	+61029	57108	16
17	86411	48809	36698	42453	83061	43769	+39948	−87031	30767	13953	17
18	62098	12825	81744	28882	27369	88183	+65846	−92545	09065	22655	18
19	68775	06261	54265	16203	23340	84750	+16317	−88686	86842	00879	19
20	52679	19595	13687	74872	89181	01939	+18447	+10787	76246	80072	20
21	84096	87152	20719	25215	04349	54434	+72344	−93008	83282	31670	21
22	63964	55937	21417	49944	38356	98404	+14850	+17994	17161	98981	22
23	31191	75131	72386	11689	95727	05414	−88727	+45583	22568	77700	23
24	30545	68523	29850	67833	05622	89975	−79042	+27142	99257	32349	24
25	52573	91001	52315	26430	54175	30122	[illegible]96	−98842	37600	26025	25
26	16586	81842	01076	99414	31574	94719	+34656	−80018	86988	79234	26
27	81841	88481	61191	25013	30272	23388	+22463	+65774	10029	58376	27
28	43563	66829	72838	08074	57080	15446	+11034	−98143	74989	26885	28
29	19945	84193	57581	77252	85604	45412	+43556	+27518	90572	00563	29
30	79374	23796	16919	99691	80276	32818	[illegible]53	−78831	54395	30705	30
31	48503	26615	43980	09810	38289	66679	+73799	+48418	12647	40044	31
32	32049	65541	37937	41105	70106	89706	+40829	+40789	59547	00783	32
33	18547	71562	95493	34112	76895	46766	−96395	+31718	48302	45893	33
34	03180	96742	61486	43305	34183	99605	[illegible]03	+13491	09243	29557	34
35	94822	24738	67749	83748	59799	25210	[illegible]93	+62925	72061	69991	35
36	34330	60599	85828	19152	68499	27977	+35611	−96240	62747	89529	36
37	43770	81537	59527	95674	76692	86420	+69930	−10020	72881	12532	37
38	56908	77192	50623	41215	14311	42834	−80651	−93750	59957	31211	38
39	32787	07189	80539	75927	75475	73965	+11796	+72140	48944	74156	39
40	52441	78392	11733	57703	29133	71164	+55355	+31006	25526	55790	40
41	22377	54723	18227	28449	04570	18882	−00023	+67101	06895	08915	41
42	18376	73460	88841	39602	34049	20589	−05701	−08249	74213	25220	42
43	53201	28610	87957	21497	64729	64983	+71551	−99016	87903	63875	43
44	34919	78901	59710	27396	02593	05665	+11964	+44134	00273	76358	44
45	33617	92159	21971	16901	57383	34262	+41744	+60891	57624	06962	45
46	70010	40964	98780	72418	52571	18415	+64362	−90636	38034	04909	46
47	19282	68447	35665	31530	59832	49181	+21914	+65742	89815	39231	47
48	91429	73328	13266	54898	68795	40948	−80808	+63887	89939	47938	48
49	97637	78393	33021	05867	86520	45363	+43066	−00988	64040	09803	49
50	95150	07625	05255	83254	93943	52325	−93230	+62668	79529	65964	50

TABLE II. Areas

Standard deviation units	0	
0.0	.0000	.0
0.1	.0398	.0
0.2	.0793	.0
0.3	.1179	.1
0.4	.1554	.1
0.5	.1915	.1
0.6	.2257	.2
0.7	.2580	.2
0.8	.2881	.2
0.9	.3159	.3
1.0	.3413	.3
1.1	.3643	.3
1.2	.3849	.3
1.3	.4032	.4
1.4	.4192	.4
1.5	.4332	.4
1.6	.4452	.4
1.7	.4554	.4
1.8	.4641	.4
1.9	.4713	.4
2.0	.4772	.4
2.1	.4821	.4
2.2	.4861	.4
2.3	.4893	.4
2.4	.4918	.4
2.5	.4938	.4
2.6	.4953	.4
2.7	.4965	.4
2.8	.4974	.4
2.9	.4981	.4
3.0	.4987	.4
3.1	.4990	.4
3.2	.4993	.4
3.3	.4995	.4
3.4	.4997	.4
3.5	.499767	
3.6	.499841	
3.7	.499892	
3.8	.499928	
3.9	.499952	
4.0	.499968	
4.1	.499979	
4.2	.499987	
4.3	.499991	
4.4	.499995	
4.5	.499997	
4.6	.499998	
4.7	.499999	
4.8	.499999	
4.9	.500000	

Note: The quantity
and the critical poi
interpolation one