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A SURVEY OF ANIMAL WASTE POLLUTION PROBLEMS ON U.S DAIRY FARMS

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A SURVEY OF ANIMAL WASTE POLLUTION PROBLEMS ON U.S. DAIRY FARMS

Introduction

Growing concern over environmental quality has resulted in recent federal legislation designed to reduce or eliminate sources of pollution. In addition to developing controls relating to other industries, the Environmental Protection Agency (EPA) has developed guidelines to control feedlot runoff discharge into surface waters. These guidelines, together with probable controls designed to regulate animal waste disposal on land and pasture, will have a significant economic impact on U.S. dairy producers.

In order to determine the economic impact of existing and proposed guidelines, information regarding dairy farm site characteristics; manure handling practices; characteristics of manure disposal areas; and required investment for added control technologies is necessary. To obtain this information a questionnaire was developed and a sample of dairy farms was surveyed.1/

Approximately 5000 questionnaires were distributed to dairy producers who belonged to cooperatives affiliated with the National Milk Producers Federation in January 1973. These patrons represent 60-70 percent of U.S. milk production. Cooperative fieldmen were instructed to select, at random, a predetermined number of dairy producers under their jurisdiction to be included in the sample.

1/ The National Milk Producers Federation (NMPF) and the Economic Research Service (ERS), U.S. Department of Agriculture jointly developed the questionnaire. NMPF then conducted a random distribution of the questionnaires to affiliated cooperatives.

Producer responses to each survey question are presented in this report. A copy of the questionnaire is shown in Appendix I.

Survey Design

The survey was designed to obtain approximately 400 responses in each of the 10 EPA regions (figure 1). A minimum of 400 valid responses, selected randomly, would provide a 95 percent level of confidence that the sample estimate of the proportion of dairy farms with a selected characteristic would be within 5 percent of the actual (true) proportion.

Survey Response

A total of 2652 questionnaires were returned. The largest number of respondents (421) was in EPA region VII. Between 350 and 399 producers responded in each of regions III, IV, and V while less than 200 producers responded in each of regions I, IX, and X (table 1). Insufficient producer response precludes making any statistically reliable statement of confidence about how accurately the survey results represent all dairy farms affiliated with NMPF. Sample error could also have been introduced through fieldman variation in selecting the sample, conducting the interviews, and interpreting the survey questions. Therefore, the results presented in this report should be interpreted accordingly. However, survey information adds knowledge that otherwise would not be available and provides a more sound basis for environmental policy decisions.

Sample Bias

One cross-check indicates that some bias was introduced by the sample survey. About 24 percent of the sample farms had 100 or more cows while only

3.4 percent of all U.S. dairy farms had 100 or more cows in 1969 (table 2). About 4 percent of the sample had fewer than 20 cows while about 50 percent of all U.S. dairy farms reported fewer than 20 cows in 1969. These farms represent less than 15 percent of the total U.S. milk production in 1969.2/ Consequently, the survey tends to represent the more typical dairy farms with more than 20 cows (which are most likely representative of NMPF producers) and is biased towards the pollution problem on these farms rather than on the smallest types of U.S. dairy farms.

Survey Results

Results of the survey are presented in two sections. Section I presents information obtained on the general farm characteristics. Part IA includes: average herd size; other livestock inventory; percent of sales from dairy; land controlled; tenure status; and farm location with respect to farm, non-farm dwellings, and public recreational areas. Part IB presents the lot runoff status of farms reporting, including the lot surface and slope as well as the destination of lot runoff. Part IC discusses routine manure handling practices for all classes of livestock including methods of storage, transportation, and disposal of livestock waste. What producers indicated they will do if faced with alternative investment expenditures, expansion of herd size, and source of financing assuming investment in runoff control facilities was necessary are presented in Part ID. Part IE reports the manure handling machinery and equipment inventory.

Section II presents a cross tabulation of selected lot runoff and manure handling questions. Part IIA reports (1) those respondents who

2/ Impacts of Alternative Dairy Price Support Levels, ERS, USDA, report to Agri. Stab. and Cons. Serv., January 1973.

indicated lot discharge into a stream or lake with no diversion of rainwater from roofs of buildings adjacent to the lot, (2) those respondents who indicated lot discharge into a stream or lake with no diversion of above-lot runoff, and (3) those respondents who indicated lot discharge into a stream or lake with neither diversion of rainwater away from the lot from roofs of buildings adjacent to the lot nor diversion of above lot runoff away from the lot.

The issue of non-point sources of land is addressed in Part IIB. Runoff of animal waste from land may be a potential pollutant where substantial amounts of manure are spread on land and then washed away by melting snow and heavy rain. Many factors affect the volume of manure runoff, including snow cover, proximity to streams and lakes, and the slope of land used for manure disposal. Part IIB presents information on respondents in selected states who indicated disposal of manure on frozen ground which is either rolling or steep and very rolling.

List of Table Subjects

List of Table Subjects (Cont.)

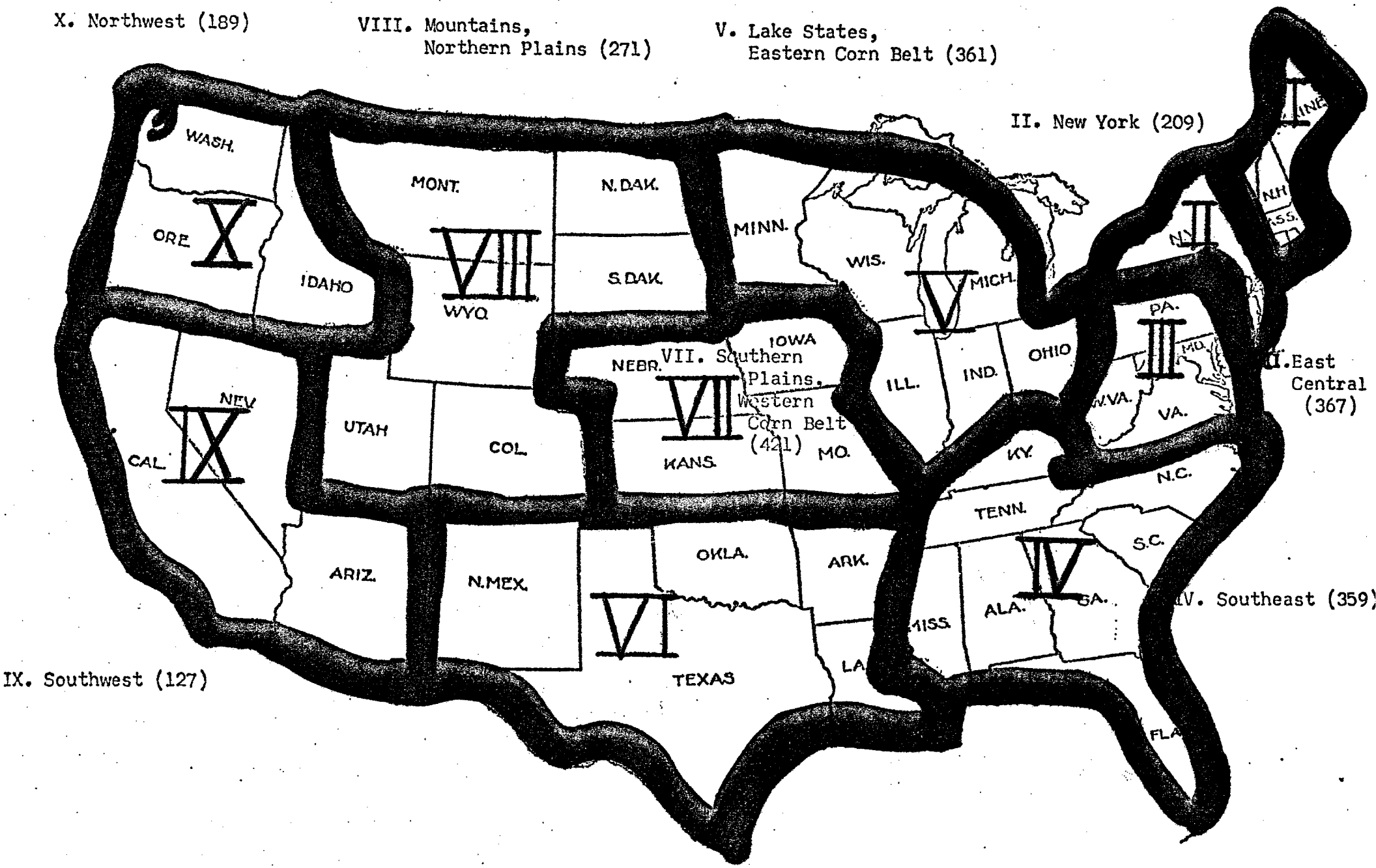


Figure 1. EPA Regions and Survey Response for Each Region

Table 1 Distribution of farms surveyed compared to 1969 census distribution of dairy farms.

	Region	All Dairy Farms*	Percent of U.S. Dairy Farms	No. of farms Surveyed
New England	I	10,851	1.9	75
New York	II	26,292	4.6	209
East Central	III	52,657	9.3	368
Southeast	IV	106,144	18.7	359
Lake States, Eastern Corn Belt	V	169,880	29.9	361
South Central	VI	51,059	9.0	270
Southern Plains and Western Corn Belt	VII	84,185	14.8	421
Mountains, Northern Plains	VIII	40,739	7.2	271
Southwest	IX	7,870	1.4	129
Northwest	X	18,385	3.2	189
Total		568,062	100.0	2,652

*Source: 1969 Census of Agriculture. Percentages listed were used as weights in computing U.S. averages

Table 2 Distribution of farms surveyed compared to 1974 projected distribution of dairy farms.

No. of Cows in Herd	Survey Distribution (% of Farms Surveyed)	1974 Projected Distribution[1/] (% of All Farms)
1-19	3.9	50.6
20-49	36.2	34.5
50-99	35.7	11.5
100+	24.2	3.4
Total	100.0	100.0

1/ Projections were made by David Cummins ERS-USDA

Section I.

A. Farm Characteristics

Table 3 (Question B-1) How many head of dairy cattle do you have on your farm at this time?

	I	II	III	IV	V	VI	VII	VIII	IX	X
	(Average head per farm)									
Milking cows	61	54	61	113	47	85	42	55	242	62
Dry cows	9	9	9	21	7	19	8	14	47	11
Dairy replacements	43	38	43	51	35	52	28	29	127	44
Maximum respondents for any one class of livestock	75	209	368	359	361	270	421	271	129	189

Section I.

A. Farm Characteristics

Table 4 (Question B-2) What other livestock do you have on your farm?

	I	II	III	IV	V	VI	VII	VIII	IX	X
	(Average head per farm)									
Farrowing sows	0	1	4	7	22	12	26	17	1	3
Feeder pigs	2	3	18	43	132	70	142	80	2	9
Beef cattle	8	10	17	57	24	41	37	43	58	42
Maximum respondents for any one class of livestock	13	27	118	96	167	82	219	91	30	76

Section I.

A. Farm Characteristics

Table 5 (Question G-5) What percentage of total agricultural product sales from your farm is from the dairy enterprise, including dairy products, dairy calves and cull cows?

%	I	II	III	IV	V	VI	VII	VIII	IX	X	U.S. Weighted Average
					(% of producers responding)						
1-39	-	0.5	0.5	1.7	4.1	1.9	13.3	5.9	1.7	8.9	4.5
40-49	-	-	0.2	0.6	1.2	-	5.1	6.3	-	1.1	1.7
50-59	-	-	1.1	4.3	4.6	1.2	16.7	11.9	1.7	8.9	6.0
60-69	-	1.5	0.2	4.3	6.1	1.9	12.3	6.3	-	2.2	5.2
70-79	-	2.0	3.0	10.9	12.2	7.4	15.0	10.3	3.4	5.0	9.9
80-89	-	2.9	4.1	9.8	13.3	5.8	9.0	8.7	3.4	5.0	9.0
90-100	100	93.2	90.7	68.4	58.6	81.7	28.6	50.6	89.7	68.7	63.6
Total respondents	72	205	365	348	345	257	413	253	117	179	2554

Section I.

A. Farm Characteristics

Table 6 (Question F-1) How many acres of land do you have under your control (own, lease, contract)?

	I	II	III	IV	V	VI	VII	VIII	IX	X	U.S. Weighted Average
					(% of producers responding)						
Average Acres	339	363	320	422	322	363	379	554	394	241	370
Total Respondents	75	208	367	357	361	265	420	269	114	187	2623

Table 7 (Question G-1) 5. Are you the owner-operator of this dairy farm?

	I	II	III	IV	V	VI	VII	VIII	IX	X	U.S. Weighted Average
					(% of producers responding)						
Yes	97.3	98.6	87.1	94.9	97.5	95.1	89.4	97.0	92.7	97.9	94.5
No	2.7	1.4	12.9	5.1	2.5	4.9	10.6	3.0	7.3	2.1	5.4
Total Respondents	74	209	365	356	355	268	417	269	123	187	2623

Table 8

(Question C-3) How far is it from the boundary of your farm to the nearest:

A. Park, picnic, or other public area.

B. Farm residence.

C. Nonfarm residence.

D. Group of 10 or more nonfarm residences.

E. Lake or reservoir used for recreation.

F. Does not apply.*

* None reported

Region I	A	B	C	D	E
		(% of producers responding)			
Miles					
<.05	1.8	5.3	5.6	3.6	-
.1	1.8	21.1	42.6	1.8	2.0
.2	1.8	31.6	20.4	7.3	2.0
.3	3.6	7.0	9.3	1.8	-
.4	-	3.5	3.7	5.5	2.0
.5-.9	3.6	17.5	14.8	10.9	-
1.0-1.9	17.8	5.3	-	18.2	6.0
2.0-4.9	28.8	5.3	3.7	40.0	26.0
5.0-9.9	21.4	3.5	-	7.3	30.0
10+	19.6	-	-	3.6	32.0
Total Responses	56	57	54	55	50

Region II	A	B	C	D	E
< .05	0.5	3.7	3.7	-	0.6
.1	3.2	34.7	52.4	7.4	1.7
.2	2.6	13.2	19.0	2.6	0.6
.3	2.1	9.5	4.8	3.2	0.6
.4	2.1	3.7	2.1	1.1	1.1
.5-.9	4.2	19.5	13.2	10.0	3.9
1.0-1.9	10.6	12.6	3.2	25.8	5.5
2.0-4.9	32.3	2.6	1.1	44.7	26.5
5.0-9.9	25.4	0.5	0.5	4.7	32.0
10+	16.9	-	-	0.5	27.6
Total Responses	189	190	189	190	181

East III	A	B	C	D	E
Miles					
< .05	-	3.6	3.7	0.7	-
.1	3.6	37.0	41.7	6.4	1.6
.2	2.5	19.0	20.3	5.7	2.0
.3	0.7	7.5	6.3	4.7	0.4
.4	0.4	3.6	3.0	2.0	-
.5-.9	6.1	18.7	15.0	12.1	2.4
1.0-1.9	12.2	9.2	7.0	20.8	4.9
2.0-4.9	35.8	1.3	3.0	38.6	18.7
5.0-9.9	26.5	-	-	7.0	29.7
10+	12.2	-	-	2.0	40.2
Total Responses	279	305	300	298	246

Region IV	A	B	C	D	E
< .05	0.3	6.6	3.6	1.0	-
.1	1.3	32.9	20.2	1.6	1.1
.2	1.0	15.2	14.0	4.5	0.3
.3	1.0	8.5	6.8	1.6	0.7
.4	0.3	4.2	2.3	-	0.3
.5-.9	2.6	19.0	16.6	12.7	1.4
1.0-1.9	8.4	9.2	14.0	14.9	3.9
2.0-4.9	26.5	3.5	15.3	33.8	15.4
5.0-9.9	22.9	0.3	5.5	20.5	26.0
10+	35.8	0.6	1.6	9.4	50.9
Total Responses	310	316	307	308	285

Region V	A	B	C	D	E
< .05	0.6	5.1	3.7	0.6	0.3
.1	0.9	24.4	18.1	1.9	0.3
.2	-	22.3	13.7	1.9	-
.3	0.6	11.1	6.5	1.6	0.3
.4	-	2.4	5.0	0.9	-
.5- .9	4.7	26.8	22.7	7.5	3.3
1.0-1.9	12.8	5.4	13.4	18.2	10.2
2.0-4.9	47.2	2.0	12.8	50.0	31.8
5.0-9.9	25.6	-	3.1	16.0	23.0
10+	7.5	0.3	0.9	1.3	30.8
Total Responses	320	332	321	318	305

Region VI	A	B	C	D	E
< .05	-	2.6	1.6	-	-
.1	0.5	15.6	7.7	1.7	-
.2	1.1	26.0	11.5	2.8	-
.3	1.1	7.3	4.4	1.1	1.2
.4	-	3.1	1.1	0.6	0.6
.5- .9	1.6	28.1	9.3	7.3	0.6
1.0-1.9	4.3	12.5	14.2	9.5	2.9
2.0-4.9	28.6	4.2	25.1	34.6	12.7
5.0-9.9	33.0	-	18.0	25.1	15.6
10+	29.7	0.5	7.1	17.3	66.5
Total	185	192	183	179	173

Region VII	A	B	C	D	E
Miles					
< .05	0.7	3.4	1.6	0.5	0.3
.1	1.0	19.0	7.1	2.1	1.1
.2	0.7	20.7	10.0	3.1	-
.3	1.0	12.7	2.6	0.8	0.3
.4	1.0	3.7	2.4	0.3	-
.5- .9	5.7	31.5	14.8	4.9	2.4
1.0-1.9	8.9	6.3	14.8	9.1	3.0
2.0-4.9	36.7	1.7	29.9	45.6	13.8
5.0-9.9	32.5	0.7	14.6	29.4	21.1
10+	11.7	0.2	2.1	4.2	58.0
Total	403	410	378	384	369

Region VIII	A	B	C	D	E
Miles					
< .05	0.4	4.1	1.6	0.8	0.8
.1	0.7	11.2	2.4	0.4	0.8
.2	0.4	18.0	4.8	0.8	0.4
.3	-	3.0	0.8	-	-
.4	-	1.1	0.8	0.4	-
.5- .9	2.2	32.2	12.8	3.1	3.4
1.0-1.9	8.2	21.7	21.2	11.5	5.7
2.0-4.9	25.8	7.9	25.2	30.0	18.3
5.0-9.9	28.5	0.4	18.8	33.1	24.0
10+	33.7	0.4	11.6	20.0	46.8
Total	267	267	250	260	263

Region IX	A	B	C	D	E
Miles					
<.05	-	3.3	1.8	-	-
.1	0.8	36.7	16.5	5.4	-
.2	1.7	11.7	11.9	6.3	-
.3	-	4.2	8.3	2.7	-
.4	-	4.2	3.7	2.7	-
.5- .9	5.0	20.0	17.4	11.7	1.0
1.0-1.9	9.2	12.5	13.8	11.7	1.0
2.0-4.9	35.0	4.2	19.3	39.6	8.3
5.0-9.9	27.5	2.5	7.3	14.4	10.4
10+	20.8	0.8	-	5.4	79.2
Total	120	120	109	111	96

Region X	A	B	C	D	E
Miles					
<.05	0.6	5.1	2.9	0.6	-
.1	2.8	34.5	18.1	1.2	0.6
.2	-	17.5	13.5	1.2	-
.3	1.1	9.6	2.9	2.3	-
.4	-	2.3	1.8	0.6	-
.5- .9	4.4	22.0	13.5	8.1	0.6
1.0-1.9	8.3	6.2	9.9	20.9	2.3
2.0-4.9	38.7	2.3	25.1	41.9	18.5
5.0-9.9	29.3	0.6	9.4	15.1	16.8
10+	14.9	-	2.9	8.1	61.3
Total	181	177	171	172	173

Section I.

B. Lot Runoff
Number of Outside Lots

Table 9

Lots	I	II	III	IV	V	VI	VII	VIII	IX	X	U.S. Weighted Average
				(% of producers responding)							
0	24.0	11.5	16.0	11.1	5.5	26.3	1.0	1.1	1.6	2.1	8.9
1	54.7	64.6	50.0	62.7	38.5	39.3	22.6	27.7	32.3	33.3	42.3
2	17.3	19.1	22.0	15.9	33.8	19.6	30.4	41.3	14.2	29.1	26.7
3	2.7	4.3	9.2	7.2	14.1	9.6	27.1	22.1	19.7	22.8	14.2
4	1.3	0.5	2.7	3.1	8.0	5.2	19.0	7.7	32.3	12.7	8.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
Total respondents	75	209	368	359	361	270	421	271	127	189	2650

Table 10 (Question C-4) What is the size of each lot?

Lot	I	II	III	IV	V	VI	VII	VIII	IX	X	U.S. Weighted Average
					(average sq. ft/cow)						
1	1728	995	868	725	2970	940	2514	2937	470	805	1884
2	767	787	3297	1043	898	377	1759	1641	328	703	1260
3	790	477	2621	616	1088	539	1322	876	3031	393	1084
4	64	150	585	898	557	482	1226	1997	212	297	778

Table 11. (Question C-5) What is the surface of the lots (primary lot)?

	I	II	III	IV	V	VI	VII	VIII	IX	X	U.S. Weighted Average
				(% of producers responding)							
Dirt	61.5	68.3	26.1	29.1	19.9	25.7	33.7	66.2	38.8	27.0	31.6
Paved	23.1	12.0	56.8	47.6	54.1	50.3	25.2	3.4	3.9	40.4	41.2
Manure Pack	1.9	-	-	1.6	0.6	1.1	1.5	0.4	35.9	2.2	1.4
Part Dirt and Paved	13.5	19.7	17.2	21.7	25.4	23.0	39.6	30.0	21.4	30.3	25.8
Total respondents	52	183	303	313	331	187	412	263	103	178	2325

Table 12. (Question C-6) What is the slope of the lots (primary lot)?

	I	II	III	IV	V	VI	VII	VIII	IX	X	U.S. Weighted Average
				(% of producers responding)							
Flat	29.4	33.2	22.1	20.2	25.0	12.7	21.6	29.9	37.4	41.8	23.7
2 - 5°	62.7	48.4	57.4	57.7	56.0	61.4	47.5	41.3	44.9	46.2	53.9
5 - 10°	7.8	16.3	17.8	18.3	14.6	21.7	24.9	21.6	15.0	9.9	18.1
10 + °	-	2.2	2.6	3.8	4.5	4.2	6.0	7.2	2.8	2.2	4.3
Total respondents	51	184	303	312	336	189	417	264	107	182	2345

Table 13 (Question C-7) Is all runoff water from land above the lot diverted away so that it does not flow through the lot (primary lot)?

	I	II	III	IV	V	VI	VII	VIII	IX	X	U.S. Weighted Average
	(% of producers responding)										
Runoff Diverted	79.6	83.2	65.7	74.0	69.8	80.3	68.7	72.6	83.8	83.6	72.6
Runoff not Diverted	20.4	16.8	34.3	26.0	30.2	19.7	31.3	27.4	16.2	16.4	27.4
Total respondents	49	185	303	311	331	188	412	263	105	183	2330

Table 14 (Question C-8) Is all rainwater from roofs of buildings adjacent to the outside lot diverted away by spouts and/or gutters so that water does not flow through the lot (primary lot)?

	I	II	III	IV	V	VI	VII	VIII	IX	X	U.S. Weighted Average
	(% of producers responding)										
Rainwater Diverted	27.5	40.8	54.3	52.9	51.3	59.6	34.4	42.8	80.0	46.9	48.8
Rainwater not Diverted	72.5	59.2	45.7	47.1	48.7	40.4	65.6	57.2	20.0	53.1	51.2
Total Respondents	51	184	302	312	335	188	410	264	105	177	2328

Table 15

(Question C-9) As a result of heavy rains or spring thaws, what happens to the runoff water from the surface of the outside lots (primary lot)?

	(% of usable responses)										U.S. Weighted
	I	II	III	IV	V	VI	VII	VIII	IX	X	Average
Total usable responses	68	209	365	351	355	259	419	266	109	185	2586
Respondents indicating no lots	18	24	59	40	20	71	4	3	2	4	245
1. Enters a continual flowing drainage ditch, creek, canal or river which flows through the lot itself.	2.9	11.5	7.1	9.4	3.9	4.6	6.7	2.6	2.6	8.6	6.3
2. Directly enters any surface waters (stream, farm pond, lake, reservoir or any other surface bodies of water) that directly border on part of the lot itself.	10.3	2.4	12.1	9.4	7.3	7.7	8.1	7.1	3.7	5.4	8.0
3. Enters any surface waters through a dry ditch, grassway and/or any surface tile inlet. (Runoff actually reaches surface water at least once each 10 years).	13.2	8.6	22.2	26.5	28.7	16.2	26.4	16.2	9.2	10.8	23.4
4. Drains into an adjacent field (field does not have surface tile inlets but is tiled below surface) and seeps into the soil (surface runoff could never actually be expected to reach any surface waters during a 10 year period)	7.4	14.4	7.9	8.3	25.9	8.1	23.4	8.3	10.1	13.0	16.1

Table 15 (cont.)

	I	II	III	IV	V	VI	VII	VIII	IX	X	U.S. Weighted Average
					(% of usable responses)						
5. Drains into an adjacent untiled field, dry ditch or grassway and seeps into the soil (surface water could never actually be expected to reach any surface waters during a 10-year period).	38.2	49.3	28.5	25.1	26.8	28.2	23.4	59.0	58.7	42.2	30.8
6. Drains into a detention pond settling basin or lagoon where runoff is collected and kept from entering a drainage ditch, stream or lake or other surface waters.	1.5	2.4	6.0	10.0	1.7	7.7	4.8	5.6	13.8	17.6	5.7
Total	73.5	88.6	83.8	88.7	94.3	72.5	92.8	98.8	98.1	97.8	90.3

Table 16 (Question D-4) If you have more than one lot, are they located so that runoff from all of them can be collected in one pond or lagoon system? If no, how many separate ponds or lagoons would be required to collect runoff from all lots.

Number of Ponds Required	I	II	III	IV	V	VI	VII	VIII	IX	X	U.S. Weighted Average
				(% of producers responding)							
1	22.2	58.3	52.9	61.3	49.5	66.7	54.5	79.8	78.9	55.8	57.0
2	66.7	20.8	39.1	32.3	36.9	28.6	30.9	18.1	15.8	34.9	32.7
3	-	18.8	5.7	6.5	12.6	2.4	12.1	1.1	-	7.0	8.7
4 +	11.1	2.1	2.3	-	1.0	2.4	2.4	1.1	5.3	2.3	1.6
Total Respondents	9	48	87	62	103	42	165	94	19	43	672

TABLE 17

(Question D-1) In order to construct a detention pond, settling basin or lagoon on your property to collect rainwater runoff before entering any surface waters, would you: (primary lot)

	I	II	III	IV	V	VI	VII	VIII	IX	X	U.S. Weighted Ave.
	(% of producers responding)										
1. Have adequate space between lot and the surface water(s) present such as stream or lake.	58	57	66	72	62	70	59	66	68	66	64.7
2. Have adequate space by refencing	4	14	12	16	17	18	15	17	16	12	15.5
3. Have to move lot	17	4	9	4	6	-	10	7	-	6	6.0
4. Have to move barn and lot (there is no space available given the layout of the farmstead.)	21	16	11	8	12	10	14	6	12	16	11.3
5. Other situations	-	9	2	1	3	2	2	4	4	-	2.6
Total Respondents	24	56	175	184	155	104	224	123	25	67	1137

Table 18

(Question C-2) For all outside lots, how far is the nearest continuously flowing stream or lake from the lot (primary lot)?

Distance (miles)	I	II	III	IV	V	VI	VII	VIII	IX	X	U.S. Weighted Average
				(% of total respondents)							
< .05	5.6	2.2	4.7	3.3	1.5	1.1	2.2	3.8	-	5.1	2.6
.1	29.6	34.6	32.7	15.7	13.6	8.3	8.5	4.9	9.2	21.6	15.4
.2	14.8	10.4	18.3	10.4	11.2	8.3	10.5	7.2	6.1	7.4	10.9
.3	3.7	10.4	6.3	11.0	7.0	3.9	5.0	3.0	2.0	1.7	6.7
.4	5.6	4.4	4.0	6.0	4.5	2.2	4.7	1.1	2.0	3.4	4.3
.5- .9	14.8	15.9	18.0	20.4	24.2	13.9	25.9	16.0	5.1	17.0	20.3
1.0-4.9	24.1	19.8	15.7	28.4	30.3	46.1	36.4	32.7	19.4	29.0	30.3
5.0-9.9	1.9	1.6	0.3	2.3	6.1	10.6	4.5	13.3	5.1	6.8	5.3
10+	-	0.5	-	2.3	1.5	5.6	2.2	17.9	51.0	8.0	4.0
Total Respondents →	54	182	300	299	330	180	401	263	98	176	2283

TABLE 19

(Question D-2) What is the distance (in feet) to the water table at the site where a detention pond, settling basin, and/or lagoon would be located to collect runoff from your outside lot(s)? (primary lot)

Distance	I	II	III	IV	V	VI	VII	VIII	IX	X	U.S. Weighted Average
	(% of producers responding)										
1-9 ft.	18.2	10.2	11.8	10.7	11.5	2.3	3.4	9.6	20.8	23.9	9.8
10-19 ft.	22.7	24.5	10.5	7.1	13.8	8.0	11.1	9.6	20.8	23.9	12.1
20 + ft.	59.1	65.3	77.6	82.1	74.6	89.8	85.6	80.9	58.3	52.1	78.1
Total respondents	22	49	152	168	130	88	208	115	24	71	1027

TABLE 20

(Question D-3) What is the soil type at each site requiring a detention pond, settling basin, and/or lagoon? (primary lot)

Soil Type	I	II	III	IV	V	VI	VII	VIII	IX	X	U.S. Weighted Average
				(% of producers responding)							
Sand	12.0	-	1.2	7.8	3.9	17.5	3.6	9.6	4.0	6.8	6.0
Sandy loam	36.0	22.0	24.6	24.0	16.9	35.0	15.9	34.4	44.0	34.2	23.2
Loam	8.0	20.0	31.0	18.4	22.1	2.9	20.5	12.8	24.0	23.3	19.3
Clay	36.0	42.0	36.3	43.6	50.6	34.0	56.4	39.2	20.0	27.4	44.7
Other	8.0	16.0	7.0	6.1	6.5	10.7	3.6	4.0	8.0	8.2	6.8
Total Respondents	25	50	171	179	154	103	220	125	25	73	1125

Table 21

C. Manure Handling Practices

(Question E-1) How do you routinely handle manure from the milking herd, dairy replacements and other livestock? (practices are described and coded below and the code is used in Table 21).

Practice A. Manure is hauled and spread on a daily basis or at least not allowed to accumulate for more than four days.

Practice B. Manure is piled outside and allowed to accumulate for more than four days before being hauled and spread.

Practice C. Store manure in liquid holding tank and haul and spread when storage tank is full or as time permits.

Practice D. Manure is piled under a roof or allowed to accumulate in the barn (in open or loafing shed for example). Manure is hauled and spread when storage area is full or as time permits.

Practice E. Flush, scrape or pump manure into a lagoon or settling pond - lagoon treatment system.

Practice F. Other

Region I

Practice Code	Milking Herd		Dairy Replacements		Other Livestock	
	Summer	Winter	Summer	Winter	Summer	Winter
	(% of Producers Responding)					
A	70.4	54.8	67.8	47.6	75.7	52.8
B	19.7	38.0	13.4	41.3	10.8	36.1
C	4.2	4.2	1.7	1.6	--	--
D	2.8	1.4	10.2	9.5	5.4	8.3
E	--	--	--	--	--	--
F	2.8	1.4	6.8	--	8.1	2.8
Total respondents	71	71	59	63	37	36

Region II

Practice Code	Milking Herd		Dairy Replacements		Other Livestock	
	Summer	Winter	Summer	Winter	Summer	Winter
	(% of Producers Responding)					
A	95.4	98.1	75.9	79.0	84.6	85.5
B	1.9	0.5	3.7	4.1	1.3	2.6
C	0.9	0.9	0.5	0.5	--	--
D	1.4	0.5	10.2	15.4	10.3	10.5
E	--	--	--	--	--	--
F	0.5	--	9.6	1.0	3.8	1.3
Total respondents	216	215	187	195	78	76

Region III

Practice Code	Milking Herd		Dairy Replacements		Other Livestock	
	Summer	Winter	Summer	Winter	Summer	Winter
	(% of Producers Responding)					
A	82.2	75.4	26.6	21.6	28.2	24.0
B	9.4	14.1	7.9	8.3	6.0	7.2
C	3.8	3.8	1.5	1.5	1.7	1.6
D	3.8	5.9	51.4	65.4	47.9	61.6
E	0.8	0.8	0.6	0.6	--	--
F	--	--	12.1	2.7	16.2	5.6
Total respondents	371	370	331	338	117	125

Region IV

Practice Code	Milking Herd		Dairy Replacements		Other Livestock	
	Summer	Winter	Summer	Winter	Summer	Winter
	(% of Producers Responding)					
A	53.5	36.7	15.2	11.6	13.8	9.2
B	19.8	31.4	10.0	12.4	11.3	18.4
C	4.5	5.0	0.9	2.5	1.3	3.4
D	6.7	13.4	13.9	32.4	15.0	26.4
E	9.7	9.2	1.7	1.7	3.8	4.6
F	5.8	4.2	58.4	39.4	55.0	37.9
Total respondents	359	357	231	241	80	87

Region V

Practice Code	Milking Herd		Dairy Replacements		Other Livestock	
	Summer	Winter	Summer	Winter	Summer	Winter
	(% of Producers Responding)					
A	70.1	58.2	36.4	25.5	32.0	22.7
B	15.3	22.8	14.6	21.9	19.3	25.3
C	4.9	5.4	1.2	1.2	1.1	1.0
D	7.4	13.3	34.6	50.2	39.2	48.5
E	--	--	--	--	--	0.5
F	2.2	0.3	13.1	1.2	8.3	2.1
Total respondents	365	368	321	333	181	194

Region VI

Practice Code	Milking Herd		Dairy Replacements		Other Livestock	
	Summer	Winter	Summer	Winter	Summer	Winter
	(% of Producers Responding)					
A	56.9	52.6	37.5	38.6	30.9	32.3
B	17.4	22.3	13.1	15.2	16.2	15.4
C	14.2	12.7	3.0	2.3	--	--
D	2.0	2.4	4.8	7.0	1.5	3.1
E	7.1	7.6	0.6	0.6	--	--
F	2.4	2.4	41.1	36.3	51.5	49.2
Total respondents	253	251	168	171	68	65

Region VII

Practice Code	Milking Herd		Dairy Replacements		Other Livestock	
	Summer	Winter	Summer	Winter	Summer	Winter
	(% of Producers Responding)					
A	56.5	44.3	35.9	22.8	34.7	25.8
B	30.8	38.6	36.1	45.0	40.2	44.8
C	3.8	3.4	--	--	0.4	0.4
D	5.0	11.3	16.8	29.5	17.7	25.4
E	1.2	1.2	0.3	0.3	0.4	0.4
F	2.6	1.2	10.9	2.4	6.6	3.2
Total respondents	416	415	357	359	271	279

Region VIII

Practice Code	Milking Herd		Dairy Replacements		Other Livestock	
	Summer	Winter	Summer	Winter	Summer	Winter
	(% of Producers Responding)					
A	43.3	34.8	22.7	15.2	17.3	11.3
B	38.0	46.8	47.2	56.7	52.0	57.8
C	2.5	2.5	0.9	0.9	1.0	1.0
D	8.5	9.6	16.2	19.9	15.3	21.6
E	1.4	1.1	0.9	0.9	1.0	1.0
F	6.3	5.3	12.2	6.5	13.4	7.4
Total respondents	284	282	229	231	202	204

Region IX

Practice Code	Milking Herd		Dairy Replacements		Other Livestock	
	Summer	Winter	Summer	Winter	Summer	Winter
	(% of Producers Responding)					
A	4.5	2.3	0.9	0.9	2.3	2.5
B	53.7	52.3	60.7	61.5	60.5	60.0
C	11.9	13.8	3.6	3.7	2.3	2.5
D	2.2	1.5	2.7	1.8	7.0	5.0
E	1.5	3.8	0.9	0.9	2.3	2.5
F	26.1	26.2	31.3	31.2	25.6	27.5
Total respondents	134	130	112	109	43	40

Region X

Practice Code	Milking Herd		Dairy Replacements		Other Livestock	
	Summer	Winter	Summer	Winter	Summer	Winter
	(% of Producers Responding)					
A	16.8	19.1	10.8	12.3	9.1	6.6
B	41.8	39.9	44.9	47.9	54.5	53.8
C	20.1	19.7	4.4	7.4	2.3	6.6
D	12.5	14.9	19.6	23.3	19.3	23.1
E	2.7	3.2	1.9	1.8	3.4	3.3
F	6.0	3.2	18.4	7.4	11.4	6.6
Total respondents	184	188	158	163	88	91

U.S. Weighted Average

Practice Code	Milking Herd		Dairy Replacements		Other Livestock	
	Summer	Winter	Summer	Winter	Summer	Winter
	(% of Producers Responding)					
A	61.5	51.3	31.7	24.7	29.6	23.5
B	20.6	27.8	19.6	25.1	22.4	27.2
C	5.6	5.7	1.2	1.6	1.0	1.5
D	5.9	10.2	23.1	35.2	24.1	32.2
E	2.9	2.9	0.6	0.6	1.0	1.3
F	3.4	2.1	23.8	12.8	21.9	14.4

Table 22. (Question E-2) If you pile manure outside does runoff from the pile or stack drain into the lot or otherwise become a part of the lot runoff?

	I	II	III	IV	V	VI	VII	VIII	IX	X	U.S. Weighted Ave.
	(% of Producers Responding)										
Yes	13.5	46.2	46.8	52.1	51.2	46.8	69.3	52.4	33.8	52.6	52.3
No	86.5	53.8	53.2	47.9	48.8	53.2	30.7	47.6	66.2	47.4	47.7
Total Respondents	37	13	77	119	127	62	238	147	68	97	985

Table 23. (Question E-4) If you store manure in a liquid holding tank, how many months can you store before you need to empty the liquid holding tank?

Months	I	II	III	IV	V	VI	VII	VIII	IX	X	U.S. Weighted Ave.
	(% of Producers Responding)										
< 1	-	33.3	-	-	-	-	-	-	5.9	-	*
1 and 2	33.3	66.7	-	11.8	10.0	37.1	13.3	-	41.1	30.6	
3	-	-	-	-	5.0	-	-	-	-	8.3	
4	-	-	-	-	5.0	-	-	12.5	-	-	
5	-	-	-	17.6	5.0	8.6	-	12.5	5.9	22.2	
6+	66.7	-	100.0	70.6	75.0	54.3	86.7	75.0	47.1	38.9	
Total Respondents	3	3	14	17	20	35	15	8	17	36	168

*Insufficient data to compute U.S. Weighted Average.

Table 24. (Question E-3) If you pile manure under roof or allow it to accumulate in the barn, how many months can you pile, stack, or let manure accumulate in the barn before it is necessary to haul and spread?

	I	II	II	IV	V	VI	VII	VIII	IX	X	U.S. Weighted Ave.
Months	(% of Producers Responding)										
1	11.1	15.2	15.6	5.9	15.2	16.7	16.7	6.5	-	15.7	13.0
2	22.2	12.1	22.9	13.9	20.4	8.3	22.5	3.2	-	5.9	16.3
3	22.2	30.3	19.5	17.8	23.6	41.7	24.2	4.8	100.0	3.9	23.2
4	22.2	6.1	13.0	10.9	11.0	-	13.3	9.7	-	5.9	10.0
5	-	3.0	2.6	10.9	3.7	-	5.0	11.3	-	5.9	5.3
6+	22.2	33.3	26.4	40.6	26.2	33.3	18.3	64.5	-	62.7	32.2
Total Respondents	9	33	231	101	191	12	120	62	1	51	811

Nature of Disposal Area

Table 25. (Question F-2) How many acres are available on which you spread manure?

	I	II	III	IV	V	VI	VII	VIII	IX	X	U.S. Weighted Ave.
Ave. Acres/ Farm	158	189	206	220	201	232	228	328	251	151	219
Total Respon- dents	75	208	368	335	360	253	418	267	117	186	2587

Table 26. (Question F-3) On how many acres do you actually spread manure in a typical year?

	I	II	III	IV	V	VI	VII	VIII	IX	X	U.S. Weighted Ave.
Ave. Acres/ Farm	86	75	78	76	65	74	70	89	135	54	73
Total Respon- dents	75	209	366	329	360	244	417	266	110	186	2562

Table 27. (Question F-4) The land on which you spread manure can best be described as:

	I	II	III	IV	V	VI	VII	VIII	IX	X	U.S. Weighted Ave.
	(% of Average Acres Used)										
1. Nearly flat	51.2	52.4	31.2	39.2	54.7	49.3	44.8	67.0	81.3	86.8	49.8
2. Rolling	44.0	44.4	64.9	59.5	43.8	47.9	53.7	31.8	17.9	13.2	48.4
3. Very steep & rolling	4.8	3.3	3.9	1.4	1.6	2.8	1.5	1.1	0.7	-	1.9
Average Acres for Producers Responding	74	75	77	74	64	71	67	88	134	53	

Table 28. (Question F-5) The land on which you spread is:

	I	II	III	IV	V	VI	VII	VIII	IX	X	U.S. Weighted Ave.
	(% of Producers Responding)										
1. Untiled	90.0	78.4	88.0	80.8	63.9	81.3	61.5	87.2	92.1	78.8	74.2
2. Tiled under surface only	10.0	21.3	12.0	19.2	34.4	18.7	36.9	12.8	7.9	19.2	25.0
3. Tiled under surface and with surface tile inlets	-	0.4	-	-	1.6	-	1.5	-	-	1.9	0.8
Average Acres for Producers Responding	70	75	75	73	61	64	65	86	126	52	

D. Producer Action Response

Table 29 (Question G-2) Assume it would be necessary to invest in additional facilities and equipment to comply with animal waste control regulations. Below is a list of five actions which you might consider, depending on the level of investment. Choose the action that you (or your landlord, if applicable) would most likely take if the total investment per head of dairy cattle was: (Assume the cost is above any cost-sharing with REAP.)

If the prospect of investing this much more per cow in my present system would be:

Less Than $15	$16-25	$26-50	$51-75	$76-100	$101-150	$150+

Then I would choose the following alternative action.

Action A - Install necessary diversion and collection facilities.

Action B - Make a major change in my dairy operation such as converting to a totally confined housing system complete with manure storage facilities necessary to eliminate outside lots and daily manure spreading.

Action C - Relocate operation to another site or farm where costs might be lower to comply.

Action D - Discontinue dairy farming.

Action E - Other

Region I

	Less than $15	$16-25	$26-50	$51-75	$76-100	$101-150	$150+
	(% of Producers Responding)						
Action A	93	77	48	36	17	13	9
Action B	-	4	13	15	15	9	4
Action C	-	4	10	6	6	4	4
Action D	7	15	29	43	62	74	84
Action E	-	-	-	-	-	-	-
Total Responses	54	52	48	47	53	54	56

Region II

	Less than $15	$16-25	$26-50	$51-75	$76-100	$101-150	$150+
	(% of Producers Responding)						
Action A	68	45	28	13	6	3	2
Action B	3	6	9	10	9	6	3
Action C	1	2	2	2	2	2	1
Action D	27	45	57	71	79	85	91
Action E	2	3	4	4	4	4	4
Total Responses	188	188	192	187	188	189	188

Region III

	Less than $15	$16-25	$26-50	$51-75	$76-100	$101-150	$150+
	(% of Producers Responding)						
Action A	80	63	39	18	7	3	1
Action B	5	7	11	14	13	2	7
Action C	1	2	2	3	4	2	4
Action D	14	28	47	64	76	93	88
Action E	-	-	1	1	-	-	-
Total Responses	333	218	321	317	314	315	321

Region IV

	Less than $15	$16-25	$26-50	$51-75	$76-100	$101-150	$150+
	(% of Producers Responding)						
Action A	81	54	28	28	11	3	1
Action B	2	7	5	5	5	2	2
Action C	1	2	6	6	8	2	2
Action D	17	36	60	60	76	93	95
Action E	-	1	1	1	-	-	-
Total Responses	316	284	276	276	271	268	271

Region V

	Less than $15	$16-25	$26-50	$51-75	$76-100	$101-150	$150+
	(% of Producers Responding)						
Action A	84	67	43	24	14	6	3
Action B	3	8	12	11	10	8	3
Action C	1	2	4	5	4	4	3
Action D	11	23	40	58	71	81	89
Action E	1	-	1	2	1	1	2
Total Responses	310	286	277	266	266	261	262

Region VI

	Less than $15	$16-25	$26-50	$51-75	$76-100	$101-150	$150+
	(% of Producers Responding)						
Action A	78	56	28	15	7	4	2
Action B	1	4	7	9	5	2	3
Action C	2	3	7	5	2	1	1
Action D	19	37	58	70	85	91	93
Action E	-	-	-	1	1	2	1
Total Responses	222	194	189	191	185	182	187

Region VII

	Less than $15	$16-25	$26-50	$51-75	$76-100	$101-150	$150+
	(% of Producers Responding)						
Action A	81	64	38	20	11	4	1
Action B	4	6	12	9	8	4	3
Action C	1	2	2	3	3	3	1
Action D	15	28	47	67	79	89	95
Action E	-	-	1	1	-	-	-
Total Responses	372	354	344	344	347	350	350

Region VIII

	Less than $15	$16-25	$26-50	$51-75	$76-100	$101-150	$150+
	(% of Producers Responding)						
Action A	72	58	36	21	13	8	6
Action B	5	9	6	5	3	2	1
Action C	3	2	4	4	5	4	1
Action D	21	31	54	70	79	86	91
Action E	-	-	-	-	-	-	1
Total Responses	254	233	218	215	212	212	211

Region IX

	Less than $15	$16-25	$26-50	$51-75	$76-100	$101-150	$150+
	(% of Producers Responding)						
Action A	78	73	49	29	12	8	5
Action B	2	3	10	13	11	8	5
Action C	12	12	15	21	27	24	21
Action D	8	13	26	35	49	58	66
Action E	-	-	-	2	1	2	3
Total Responses	111	102	102	99	97	98	95

Region X

	Less than $15	$16-25	$26-50	$51-75	$76-100	$101-150	$150+
	(% of Producers Responding)						
Action A	74	62	48	35	17	9	7
Action B	3	5	7	6	11	7	3
Action C	3	2	4	2	3	7	5
Action D	20	31	42	57	70	78	85
Action E	-	-	-	1	-	-	-
Total Responses	150	133	130	127	119	119	123

U.S. Weighted Average

	Less than $15	$16-25	$26-50	$51-75	$76-100	$101-150	$150+
				(% of Producers Responding)			
Action A	80.3	61.2	36.9	19.5	10.5	4.9	2.5
Action B	3.0	6.8	9.4	9.1	8.2	4.7	3.1
Action C	1.4	2.3	4.3	5.0	4.2	3.3	2.5
Action D	14.8	29.4	48.5	65.2	76.7	86.4	91.0
Action E	0.4	0.3	0.9	1.2	0.5	0.7	1.0

Table 30. (Question G-3). If you continued dairy farming and made necessary pollution control improvements, would you increase herd size?

	I	II	III	IV	V	VI	VII	VIII	IX	X	U.S. Weighted Average
	(% of Producers Responding)										
Would increase	18.3	25.4	41.2	43.4	41.9	33.5	42.1	51.2	45.0	54.1	41.1
Would not increase	81.7	74.6	58.8	56.6	58.1	66.5	57.9	48.8	55.0	45.9	58.9
Total Respondents	71	193	340	332	346	251	394	260	109	181	2477

Table 31 (Question G-4) If financing is needed, other than cost sharing, which would you likely use to make pollution control improvements?

	I	II	III	IV	V	VI	VII	VIII	IX	X	U.S. Weighted Average
	(% of Producers Responding)										
1. Local Bank	34.7	41.8	55.9	38.0	55.7	59.8	62.4	49.8	55.0	35.4	51.7
2. PCA	27.8	37.6	22.0	38.0	20.7	12.8	17.3	19.9	22.9	30.9	24.0
3. Federal Land Bank	22.2	6.1	9.6	12.9	12.9	7.3	12.4	12.4	14.7	14.0	11.9
4. Insurance Company	-	0.6	-	0.6	-	-	0.3	0.4	-	2.8	0.3
5. Individual	1.4	4.2	7.5	3.3	4.9	3.4	2.8	2.4	5.5	5.6	4.2
6. Other	13.9	9.7	4.9	7.2	5.7	16.7	4.9	15.1	1.8	11.2	7.9
Total Respondents	72	165	345	334	348	234	388	251	109	178	2424

E. Manure handling machinery and equipment available

Table 32. (Question H) How many items of manure handling and storage equipment do you own, rent, or have access to on this farm?

	I	II	III	IV	V	VI	VII	VIII	IX	X	U.S. Weighted Average
	(% of Total Respondents)										
Tractor-less than 65 HP	90.7	93.3	95.1	93.0	93.9	84.8	91.4	93.7	88.4	94.2	92.5
Tractor- 65 or more HP	68.0	61.7	65.5	63.8	72.6	45.9	70.3	76.8	35.7	51.3	66.1
Manure spreader (solid)	93.3	97.6	92.4	76.9	95.8	74.8	96.0	93.0	43.4	91.5	89.1
Manure spreader (liquid)	10.7	6.2	28.0	17.8	16.6	19.6	12.1	9.6	20.2	32.3	16.9
Mechanical manure scraper	9.3	12.4	7.9	16.7	16.1	13.0	14.5	9.2	10.9	13.8	14.0
Tractor-mounted scraper	48.0	49.8	79.3	89.1	75.9	80.4	68.4	57.6	85.3	90.5	75.5
Tractor-mounted manure loader	90.7	79.4	89.9	75.8	92.5	53.7	91.2	95.9	81.4	91.0	84.9
Gutter cleaner	73.3	82.3	33.2	2.5	41.3	2.2	20.4	25.8	-	-	26.2
Manure carrier	8.0	1.0	3.0	12.3	3.0	10.7	5.7	7.7	5.4	1.1	6.1
Mechanical stacker	8.0	-	0.5	0.8	2.2	0.4	0.7	0.7	0.8	2.1	1.3
Agitating pump	1.3	0.5	4.1	5.3	6.1	11.9	3.1	4.8	14.7	28.6	6.2
Soil injector	-	-	0.3	0.3	1.4	2.2	0.5	1.1	-	-	0.9
Irrigation system	-	-	2.4	3.1	0.8	2.2	1.2	2.6	28.7	10.6	2.3
Insect sprayer	38.7	27.8	49.5	51.8	51.8	55.2	55.8	69.4	48.8	48.1	52.2
Aerator	1.3	-	0.8	4.5	0.3	4.8	1.0	2.6	4.7	0.5	1.9
Pump	1.3	-	2.4	6.7	2.5	13.3	2.6	3.7	25.6	12.7	4.9
Total Respondents	75	209	368	359	361	270	421	271	129	189	2652

Section II

A. Lot runoff

Table 33. 1. Respondents indicating lot runoff into a stream or lake where run off actually reaches the stream or lake at least once each ten years without diversion of rainwater from roofs of buildings adjacent to the lot.

	I	II	III	IV	V	VI	VII	VIII	IX	X	U.S. Weighted Average
% of total valid responses	19.1	14.6	21.1	19.9	22.0	12.4	35.1	20.3	7.3	16.2	21.7
Total valid responses	68	199	365	351	355	259	419	266	109	185	2576

Table 34. 2. Respondents indicating lot runoff into a stream or lake where runoff actually reaches the stream or lake at least once each ten years without diversion of above-lot runoff away from the lot.

	I	II	III	IV	V	VI	VII	VIII	IX	X	U.S. Weighted Average
% of total valid responses	8.8	7.0	15.1	12.5	16.9	6.2	18.6	11.7	7.3	3.8	13.7
Total valid responses	68	199	365	351	355	259	419	266	109	185	2576

Table 35 3. Respondents indicating lot runoff into a lake or stream where runoff actually reaches the lake or stream at least once each 10 years without diversion of rainwater from roofs of buildings adjacent to the lot and without diversion of above-lot runoff.

	I	II	III	IV	V	VI	VII	VIII	IX	X	U.S. Weighted Ave
% of total valid responses	7.4	5.0	11.2	10.0	11.8	3.5	15.3	10.2	5.5	3.2	10.3
Total valid responses	68	199	365	351	355	259	419	266	109	185	2576

Table 36 B. Manure handling practices during winter months for the milking herd in selected states.

	Total survey respondents	Respondents who spread manure from the milking herd on a daily basis on steep ground during winter months	% of total	Respondents who store manure from the milking herd and spread on steep ground during winter months	% tota
Vermont	50	25	50.0	1	2.(
New York	209	174	83.3	2	1.(
Pennsylvania	114	71	62.3	5	4.4
Illinois	51	13	25.5	4	7.8
Indiana	32	7	21.9	11	34.4
Michigan	103	45	43.7	5	4.9
Minnesota	51	31	60.8	2	3.9
Ohio	63	18	26.5	16	23.5
Wisconsin	56	33	58.9	1	1.8
Iowa	251	112	44.6	27	10.8
Kansas	80	16	20.0	10	12.5
Missouri	42	11	26.2	4	9.5
Nebraska	48	7	14.6	2	4.2
Colorado	66	-	-	2	3.(
North Dakota	82	10	12.2	4	4.9
South Dakota	100	43	43.0	5	5.(
Total	1403	616		101	

Appendix I - Survey Questionnaire

NATIONAL MILK PRODUCERS FEDERATION
30 F Street, N. W.
Washington, D. C.

DAIRY FARM WASTE MANAGEMENT PRACTICES

(Office codes)

A. Farm Location

1. County ---------- (_____) [ ]

2. State ---------- (_____) [ ]

B. Inventory of Livestock:

1. How many head of dairy cattle do you have on your farm at this time?

	Code	Number
Milking cows	01	
Dry cows	02	
Dairy replacements	03	
Total	04	

2. What other livestock do you have on your farm?

Farrowing sows	05	
Feeder pigs	06	
Beef cattle or dairy cattle raised for beef	07	

C. Description of Livestock Lots

If you have any outside barnyards, exercise lots or open lots in which livestock is confined for any part of the year, answer the following questions. Do not include pasture. If all livestock is completely confined under roof all year and have no access to outside lot, go to Section D. Use a column for each separate lot whether lots are on the same farmstead or on separate farmsteads.

1. What class or classes of livestock primarily use each outside lot?

(Enter appropriate livestock code(s) for each lot)

[01] Milk cows
[02] Dry cows
[03] Dairy Replacement
[04] Sows
[05] Feeder pigs
[06] Beef cattle

Outside Lot No.

01	02	03	04

Outside Lot No.

2. For all outisde lots, how far is the nearest continuously flowing stream or lake from the lot? ----------

01	02	03	04
(Nearest 0.1 Mile)			
.	.	.	.

3. How far is it from the boundary of your farm to the nearest: (Nearest 0.1 Mile)

/01/ Park, picnic, or other public area ----------

/02/ Farm residence ----------

/03/ Nonfarm residence ----------

/04/ Group of 10 or more nonfarm residence ----------

/05/ Lake or reservoir used for recreation ----------

/06/ Does not apply ----------

4. What is the size of each lot? Length (ft.)-------

Width (ft.) -------

(Office use) -------

01	02	03	04

5. What is the surface of the lots? ----------

01	02	03	04

/01/ Dirt /03/ Manure Pack

/02/ Paved /04/ Part dirt & paved

Outside Lot No.

6. What is surface slope of lots? ----------

01	02	03	04

/01/ Flat /03/ 5° - 10°

/02/ 2° - 5° /04/ Over 10°

Outside Lot No.

7. Is all runoff water from land above the lot diverted away so that it does not flow through the lot? Yes = 1 No = 0 ----------

01	02	03	04

8. Is all rainwater from roofs of buildings adjacent to outside lot diverted away by spouts and/or gutters so that water does not flow through the lot? Yes = 1 No = 0 ----------

Outside Lot No.			
01	02	03	04

9. As a result of heavy rain or spring thaws, what happens to the runoff water from the surface of the outside lots? (Choose the one most applicable alternative for each lot.)

01	02	03	04

/01/ Enters a continual flowing drainage ditch, stream, creek, canal or river that runs through the lot itself.

/02/ Directly enters any surface waters (stream, farm pond, lake, reservoir or any other surface bodies of water) that directly border on part of the lot itself.

/03/ Enters any surface waters through a dry ditch, grassway and/or any surface tile inlet. (Runoff actually reaches surface water at least once each 10 years.)

/04/ Drains into an adjacent field (field does not have surface tile inlets but is tiled below surface) and seeps into the soil (surface runoff could never actually be expected to reach any surface waters during a 10 year period.)

/05/ Drains into an adjacent untiled field, dry ditch or grassway and seeps into the soil (runoff could never actually be expected to reach any surface waters during a 10 year period).

/06/ Drains into a detention pond, settling basin or lagoon where runoff is collected and kept from entering a drainage ditch, stream or lake or other surface waters.

Instructions: If alternatives /04/, /05/, /06/ above in question C-9 apply to all lots under your control, go to Section E, unless you have some definite reason to believe you will have to construct some rainwater runoff collection facility. If so, continue to Section D.

D. Construction of Water Collection Facilities
(Questions in this section apply to alternatives /01/, /02/, /03/, question C-9 on preceding page.)

1. In order to construct detention pond, settling basin or lagoon on your property to collect rainwater runoff before entering any surface waters, would you: ----------

Outside Lot No.			
01	02	03	04

/01/ Have adequate space between lot and the surface water(s) present such as stream or lake

/02/ Have adequate space by refencing

/03/ Have to move lot

/04/ Have to move barn and lot (There is no space available given the layout of farmstead to construct runoff detention facilities at existing lot site)

/05/ Other situations
(If checked, explain briefly.)

_____

_____

2. What is the distance (feet) to the water table at the site where a detention pond, settling basin, and/or lagoon would be located to collect runoff from your outside lot(s): ----------
(If exact distance is unknown, give best approximation from experience with well.)

Outside Lot No.			
01	02	03	04

3. What is the soil type at each site requiring a detention pond, settling basin, and/or lagoon? ----------

01	02	03	04

/01/ Sand /02/ Sandy Loam

/03/ Loam /04/ Clay

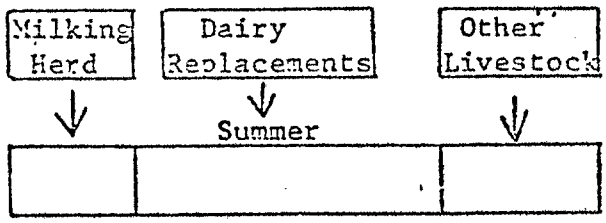
/05/ Other (Identify) _____

4. If you have more than one lot, are they located so that runoff from all of them can be collected in one pond or lagoon system. Yes = 1 No = 0 ---------

If no, how many separate ponds or lagoons would be required to collect runoff from all lots? ----------
(If unknown, give your best estimate from layout or drainage of your lot area.)

Manure Handling Practices

1. How do you routinely handle manure from the milking herd, dairy replacements and other livestock? For each type of livestock ----



(Choose a code from the practices listed below which best describes the way you handle manure.)

/01/ Manure is hauled and spread on a daily basis or at least not allowed to accumulate for more than 4 days.

/02/ Manure is piled outside and allowed to accumulate for more than 4 days before being hauled and spread.

/03/ Store manure in liquid holding tank and haul and spread when storage tank is full or as time permits.

/04/ Manure is piled under roof or allowed to accumulate in the barn (in a pen or loafing shed for example). Manure is hauled and spread when storage area is full or as time permits.

/05/ Flush, scrape or pump manure to a lagoon or settling pond-lagoon treatment system.

/06/ Other (Explain how you routinely handle manure from the milking cows, dairy replacements and other livestock if none of the above alternatives are applicable.) _____

_____

2. If you entered practice /02/ in any box in question E-1, does runoff from the pile or stack drain into the lot or otherwise become a part of the lot runoff? Yes = 1 No = 0 [ ]

3. If you entered practice /04/ in any box in question E-1, how many months can you pile, stack or let manure accumulate in the barn before it is necessary to haul and spread? ---------- Months [ ]

4. If you entered /03/ in any box in question E-1, how many months can you store before you need to empty the liquid holding tank? ---------- Months [ ]

Land for Spreading Manure

1. How many acres of land do you have under your control (own, lease, contract)? ---------- Acres

2. How many acres are available on which you spread manure? ---------- Acres

3. On how many acres do you actually spread manure in a typical year? ---------- Acres

4. The land on which you spread manure can best be described as: (Indicate percentage of land under each category.)

		Percentage
Nearly flat ----------	01	
Rolling ----------	02	
Very steep and rolling ----------	03	
TOTAL ----------		100

5. The land on which you spread is: (Indicate percent of land under each category.)

Untilled ----------	01	
Tiled under surface only ----------	02	
Tiled under surface and with surface tile inlets ----------	03	
		100

Costs

1. Are you the owner-operator of this dairy farm?
Yes = 1 No = 0 ---------- [ ]

2. Assume it would be necessary to invest in additional facilities and equipment to comply with animal waste control regulations. Below is a list of 5 actions which you might consider, depending on the level of investment. Choose the action that you (or your landlord, if applicable) would most likely take if the total investment per head of dairy cattle was: (Assume the cost is above any cost-sharing with REAP.)

NOTE: Read entire question and each alternative before you mark any answer.

If the prospect of investing this much more per cow in my present system would be:

Less than $15	$16-$25	$26-$50	$51-$75	$76-$100	$101-$150	More than $150
[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

Then, I would choose the following alternative action from the list below. (Enter one code per box. Fill each box with appropriate choice. You should fill each box with the most appropriate code to satisfy the computer.)

/01/ Install necessary diversion and collection facilities.

/02/ Make a major change in my dairy operation such as converting to a totally confined housing system complete with manure storage facilities necessary to eliminate outside lots and daily manure spreading.

/03/ Relocate operation to another site or farm where costs might be lower to comply.

/04/ Discontinue dairy farming.

/05/ Other (briefly explain) _____

_____

3. If you continued dairy farming and made necessary pollution control improvements, would you increase herd size? Yes = 1 No = 0 [ ]

4. If financing is needed, other than cost-sharing, which would you likely use to make pollution control improvements? (Fill in code of alternatives.) [ ]

/01/ Local Bank
/02/ PCA
/03/ Federal Land Bank
/04/ Insurance Co.
/05/ Individual
/06/ Other (Specify) _____

5. What percentage of total agricultural product sales from your farm is from the dairy enterprise, including dairy products, dairy calves and cull cows. ----------

Percent
..

H. Inventory of Manure Handling and Storage Equipment

How many items of manure handling and storage equipment do you own, rent, or have access to on this farm? (From the list below, enter the total number of each item. If none, enter 0.)

Tractor-less than 65 HP ----------	01	
Tractor-65 or more HP ----------	02	
Manure spreader (solid) ----------	03	
Manure spreader (liquid) ----------	04	
Mechanical manure scraper ----------	05	
Tractor-mounted scraper ----------	06	
Tractor-mounted manure loader ----------	07	
Gutter cleaner ----------	08	
Manure carrier ----------	09	
Mechanical stacker ----------	10	
Agitating pump (liquid storage) ----------	11	
Soil injector (attachment for liquid manure spreader) ----------	12	
Irrigation system (for emptying storage tank, holding pond or lagoon) ----------	13	
Insect sprayer ----------	14	
Aerator (lagoon or oxidation pond) ----------	15	
Pump (for emptying holding pond or lagoon) ----------	16	

I. Comments: _____