

1972 NATIONAL DUMP SITE SURVEY REPORT

Prepared by

**Special Projects Section
Disposal Technology Branch
Processing and Disposal Division**

**Office of Solid Waste Management Programs
U. S. ENVIRONMENTAL PROTECTION AGENCY**

March 1973

CONTENTS

I.	INTRODUCTION	1
II.	SURVEY OPERATIONS	1
III.	SURVEY FORMS	2
IV.	DISCUSSION AND CONCLUSIONS	3

APPENDIX A

APPENDIX B

I. INTRODUCTION

During the period 1966-1969, the majority of the State solid waste management agencies surveyed solid waste disposal practices within their jurisdictions. That survey indicated that 94 percent of the country's land disposal sites were environmentally unacceptable. Since the 1968 National Survey, many States have established solid waste management agencies with authorities and resources to upgrade land disposal practices.

The U.S. Environmental Protection Agency, as an integral part of the Mission 5000 program, conducted the 1972 National Dump Site Survey in the summer and fall of 1972. The objective of the 1972 Survey was to make an estimate of the number of open and burning dumps in the United States so that at least general comparisons of the progress in upgrading land disposal practices over the past four years could be made. The Office of Solid Waste Management Programs, as the coordinator of the Survey, presents this report to the Regional Offices for their use in evaluating their Region's status regarding solid waste land disposal practices.

II. SURVEY OPERATIONS

The 1972 Survey was initiated at the July 6 and 7, 1972, Mission 5000 Summer Intern Orientation Session held in Cincinnati. The Regional Office staff was briefed on the Survey; and the summer interns were familiarized with the Mission 5000 Program,

survey procedures, completion of survey forms, identification of dump sites, and general personnel information.

The Regional Office staff sent the survey data they collected to OSWMP, Cincinnati, where the Special Projects Section, Processing and Disposal Division, staff recorded and verified the data and then gave it to the Computer and Statistical Support Section, Assistance Branch, Systems Management Division, for statistical analysis. The statistical procedures and basic results are presented by Betty L. Grupenhoff, Statistician, Systems Management Division, in her correspondence regarding the 1972 Survey (see Appendix A).

III. SURVEY FORMS

The form used in surveying the sites is identical to the one used in the 1968 National Survey; however only certain items on the form were reported for this Survey due to limited manpower, time, and scope of the Survey. Information gathered was used by the Regional staff in determining whether a disposal site was in fact a dump. The Special Projects Section performed a separate review of the survey forms and made the final determination as to whether a reported site was in fact a dump. If a site had any one of three major environmental problems--inadequate cover, burning, or water pollution--the site was recorded as a dump. A copy of the form used and the information gathered is attached in Appendix B.

IV. DISCUSSION AND CONCLUSIONS

Based on the 1972 National Dump Site Survey, we estimate that there are 17,339 dump sites existing in the 46 States surveyed. This is the best estimate we have of the number of existing dump sites. The 1968 Survey reported approximately 14,895 dump sites for the same 46 States; therefore, it would be reasonable to say that there are approximately 2,500 more dump sites existing now than in 1968. The fact that this is an estimate of the net change in the number of dumps existing then and now must be emphasized and cautions given to prevent anyone from trying to make improper conclusions from our data. The net change is due to the closing of some dumps and opening of others and not due only to dumps being opened.

In Table A the number of estimated 1972 dump sites, the 95 percent confidence interval for the 1972 estimate, and the number of dump sites counted in 1968 are listed for each State. Also the table shows the percent change in the dump sites for each State. It should be noted that the data cannot be used to say anything about the number of dump sites being closed or opened. For instance, one cannot say from Table A that Alabama has closed 13 dumps since 1968 because during the four years they may have opened and closed some greater number of dumps that would not affect the total that we estimate exist in 1972. A similar concept is true when looking at Arkansas. One cannot correctly say that 47 sites have been opened during that time. The same caution applies to the data for all of the States.

The data in Table A shows that the percent of change in dump sites among the States ranged from a decrease of 90 percent for Delaware to an estimated increase of 260 percent for Georgia.

If we assume that a change between the number of dumps in 1968 and 1972 is significant when it results in at least a 10 percent change, then Table A shows that 24 States had a decrease in the number of dumps, 15 States had no change, and 7 States had an increase in the number of dump sites.

Since it was our engineering judgement that formed the basis for assuming that at least a 10 percent increase or decrease in the number of dump sites was required to show a real change, it should be noted that other assumptions can be made. Perhaps the most logical would be to assume that the percent of increase or decrease calculated is the best estimate of the actual change. If the data is used on an absolute basis then Table A would show that 32 States had a decrease in the number of dumps, one State had no change, and 13 had an increase in the number of dump sites.

Figure A shows the data in a cumulative frequency diagram. On an absolute basis, Figure A shows that approximately 70 percent of the States have fewer dump sites existing now than in 1968 and roughly 30 percent of the States have more dump sites now than in 1968.

STATE	TABLE A				
	Estimated Dump Sites in 1972 ^{1,6}	95% Confi- dence Interval ²	Number of Dump Sites In 1968 ³	Percent Decrease In Dump Sites ⁴	Percent Increase In Dump Sites ⁵
Alabama	177	160-194	190	7	
Arizona	33	20-47	100	67	
Arkansas	342	309-376	295		16
California	243	231-256	720	66	
Colorado	189	182-196	285	34	
Connecticut	125	117-133	129	3	
Delaware	2	1-4	20	90	
Florida	356	350-362	424	16	
Georgia	508	475-541	141		260
Idaho	163	129-197	55		196
Illinois	480	438-522	534	10	
Indiana	295	284-313	447	32	
Iowa	348	325-371	303		15
Kansas	527	523-531	536	2	
Kentucky	262	232-292	215		22
Louisiana	242	239-245	249	3	
Maine	380	377-383	358		6
Maryland	86	77-95	150	43	
Massachusetts	313	306-321	328	5	
Michigan	771	747-795	986	22	
Minnesota	547	497-597	589	7	
Mississippi	414	401-427	389		6
Missouri	436	421-451	483	10	
Montana	57	42-72	95	40	
Nevada	29	7-51	51	43	
New Hampshire	169	165-173	140		21
New Jersey	214	205-223	247	13	
New Mexico	114	112-116	111		3
New York	691	671-711	831	17	
North Carolina	355	326-384	458	25	
North Dakota	345	336-354	403	14	
Ohio	228	216-240	658	65	
Oklahoma	241	231-251	295	18	
Oregon	220	215-225	209		5
Pennsylvania	248	238-258	560	56	
Rhode Island	39	35-43	39	0	
South Carolina	265	254-276	256		4
South Dakota	355	350-360	387	8	
Tennessee	236	221-251	267	12	
Texas	587	555-620	835	30	
Utah	157	153-161	172	9	
Vermont	115	105-125	154	25	
Virginia	292	281-303	223		31
Washington	338	326-350	334		1
West Virginia	115	96-134	179	36	
Wyoming	51	47-55	65	22	

1 Estimates from 1972 National Dump Site Survey.

2 Denotes that there is 95% confidence that the true 1972 value lies within this range.

3 Number from 1968 National Survey.

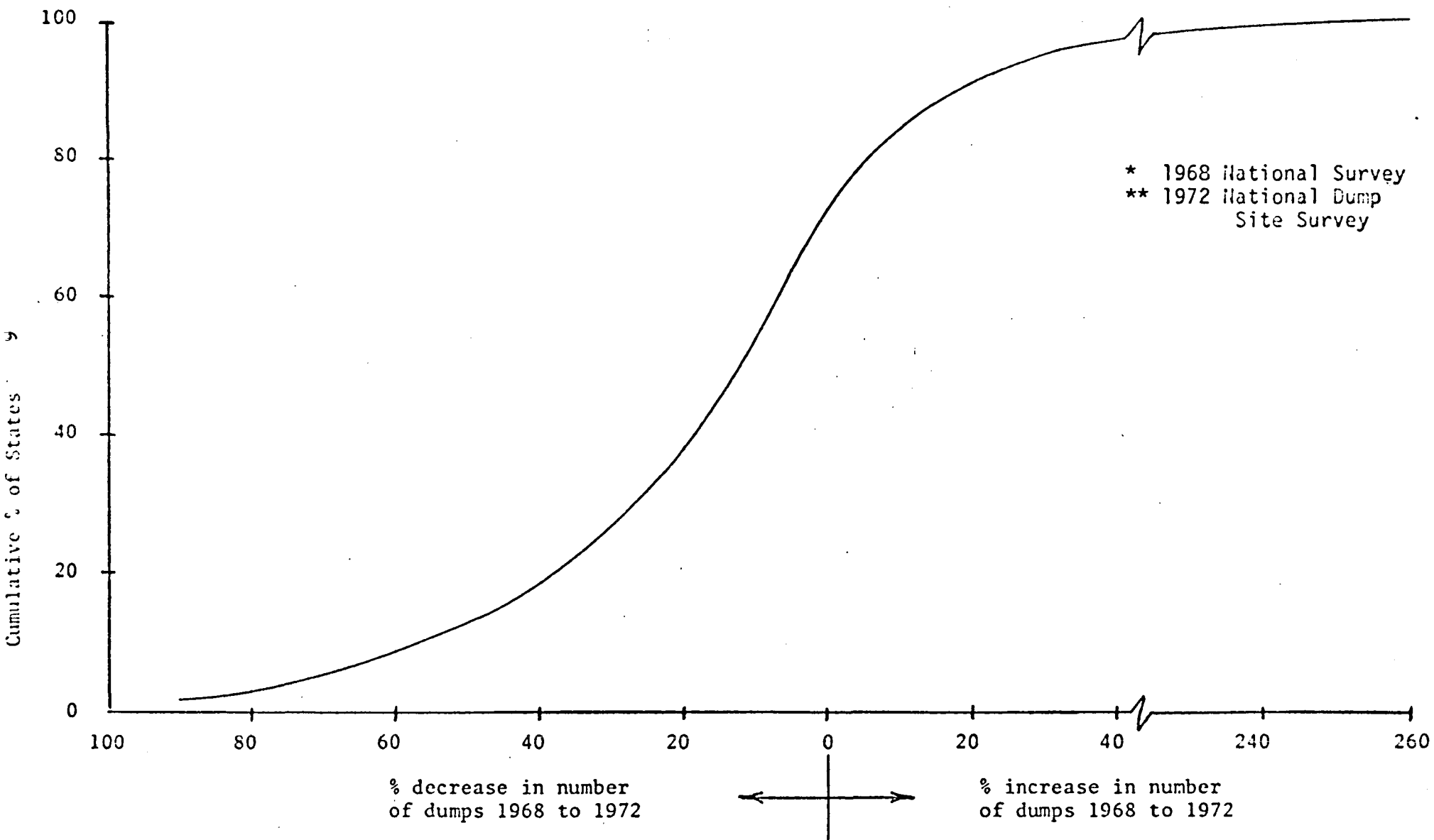
4 $(1968 \text{ Number} - 1972 \text{ Estimate} / 1968 \text{ Number}) \times 100$.

5 $(1972 \text{ Estimate} - 1968 \text{ Number} / 1968 \text{ Number}) \times 100$.

6 A vertical summation of this column will not equal the 1972 best estimate for the national number of dumps because of statistical considerations.

FIGURE

% of States vs. % increase or decrease in number of dumps 1968* to 1972**



APPENDIX A

Correspondence of Betty L. Grupenhoff, Statistician,
Computer and Statistical Support Section, Assistance
Branch, Systems Management Division regarding 1972
Survey:

- 1) Final description of procedures and results,
- 2) Determination of sample selection for 1972 Survey;
and,
- 3) Explanation of sample selection sent to several
Project Officers.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Solid Waste Management Programs

REPLY TO
ATTN OF:

ABSS

DATE: February 8, 1973

SUBJECT:

Survey for Mission 5000

TO:

Mr. Donald Kee, Project Officer
Special Projects Section, DTB, P&DD
Through: Mr. S. Jackson Hubbard
Technical Advisor, DTB, P&DD
Mr. Walter Liberick, Chief, DTB, P&DD

The survey for Mission 5000 has been completed. A description of the procedures used in this survey and the results are presented in this report.

Three basic activities were involved in this project. These activities were (1) design of an economical sampling plan and selection of a sample, (2) data collection and (3) data analysis. In previous memos, copies of which are attached, and conversations, the sampling plan, the sample selection procedures, and the assumptions and constraints imposed by the chosen plan were discussed. Rather than reiterate these specifics, only general comments concerning these will be presented.

From the 1968 survey, it is known how many unacceptable sites were observed in each county surveyed in each State. According to survey sampling theory, it is normally possible to increase the efficiency of the sampling efforts if related external information is used in the design and analysis phases of the study. In order to use this information an independent random sample of counties surveyed in 1968 was selected from almost every State in the United States. Counties were not selected from Alaska, Hawaii, Nebraska or Wisconsin. These States were not included for one of the following two reasons: (1) they are currently conducting a survey that will furnish the information desired, Nebraska and Wisconsin (2) to survey Alaska and Hawaii was not economically feasible because of travel costs.

From the survey we obtained the number of unacceptable sites or dumps existing in the selected counties. The reasoning for this approach was, that for each State it would be possible to use the 1968 and the 1972 sample results to determine the magnitude of the increase or decrease in number of unacceptable

sites for the sampled counties. Since these counties were selected at random, the measured increase or decrease can be applied to each State as a whole.

The third main activity began with the reception of the data. A ratio of the number of unacceptable sites in 1972 to the number of unacceptable sites reported in the National Survey of 1968 was calculated for each State considered in this project. This ratio times the number of unacceptable sites in 1968 was used to estimate the total number of unacceptable sites existing in each State in 1972. The formulas used to estimate the State totals are the following:

$$r = \frac{\sum_{h=1}^n W_h \bar{x}_h}{\sum_{h=1}^n W_h \bar{y}_h}$$

where $W_h = \frac{n_h}{N_h} = \frac{\text{number of counties selected in State } h}{\text{total number of counties in State } h}$

\bar{x}_h = average number of unacceptable sites per county in 1972

\bar{y}_h = average number of unacceptable sites per county in 1968

$T = Y \cdot r$ = estimated total number of unacceptable sites in the State in 1972

where Y = total number of unacceptable sites in the State in 1968

Since a sample can only provide an estimate of the total results, it seemed advisable to calculate the confidence limits about the estimated totals in order to see how far off the sample estimates might be. This does not mean that the sample estimate is wrong but only gives the outer limits of possible error due to sampling variation. The sample estimate of the total is the best estimate of the actual number of unacceptable sites within each State. Both 95% and 80% confidence intervals about the estimates were calculated for each State and these are presented in Table 1.

3
TABLE I

State	Estimated Sites in 1972	Variance of Estimate of Total Dump Sites	95% Confidence Interval	80% Confidence Interval
Alabama	177	76.47696	160-194	166-188
Arizona	33	47.30310	20-47	24-42
Arkansas	342	291.84684	309-376	320-364
California	243	40.54256	231-256	235-251
Colorado	189	14.20800	182-196	184-194
Connecticut	125	18.45855	117-133	120-131
Delaware	2	0.60768	1-4	1-3
Florida	356	8.05000	350-362	352-360
Georgia	508	283.09500	475-541	486-530
Idaho	163	308.88462	129-197	141-186
Illinois	480	467.45193	438-522	452-508
Indiana	298	54.35577	284-313	289-308
Iowa	348	134.28909	325-371	333-363
Kansas	527	4.87340	523-531	524-530
Kentucky	262	238.79592	232-292	242-282
Louisiana	242	2.75625	239-245	240-244
Maine	380	3.09729	377-383	378-382
Maryland	86	21.81267	77-95	80-92
Massachusetts	313	14.60710	306-321	308-318
Michigan	771	151.61300	747-795	755-787
Minnesota	547	650.05884	497-597	522-573
Mississippi	414	44.96500	401-427	405-423
Missouri	436	57.47481	421-451	426-446
Montana	57	55.82400	42-72	47-67
Nevada	29	126.64736	7-51	15-43
New Hampshire	169	3.67608	165-173	167-172
New Jersey	214	19.09800	205-223	208-220
New Mexico	114	1.20832	112-116	113-115
New York	691	105.39584	671-711	678-704
North Carolina	355	219.90468	326-384	336-374
North Dakota	345	20.10176	336-354	339-351
Ohio	228	40.14320	216-240	220-236
Oklahoma	241	24.25203	231-251	235-247
Oregon	220	7.51275	215-225	217-224
Pennsylvania	248	25.40664	238-258	242-254
Rhode Island	39	4.34826	35-43	36-42
South Carolina	265	31.90104	254-276	258-272
South Dakota	355	5.39136	350-360	352-358
Tennessee	236	61.23775	221-251	226-246
Texas	587	274.75200	555-620	566-608
Utah	157	3.67608	153-161	155-159
Vermont	115	25.55318	105-125	109-121
Virginia	292	33.19294	281-303	285-299
Washington	338	34.26720	326-350	331-346
West Virginia	115	95.52600	96-134	102-128
Wyoming	51	4.22100	47-55	48-54

In order to calculate the confidence intervals the standard deviation of the ratio must be calculated. Since the statistic being analyzed was a ratio the following formula for calculating the variance of a ratio was used:

$$\text{var}(r) = \frac{N-n}{N(n)} \left(\frac{1}{\bar{y}} \right) (\text{var}(x) + r^2 \text{var}(y) - 2r \text{cov}(xy))$$

where $r = \frac{\sum x}{\sum y} = \frac{\text{number of sites in selected counties in 1972}}{\text{number of sites in selected counties in 1968}}$

N = total number of counties in State

n = number of counties in sample

\bar{y} = average number of unacceptable sites per county in the State in 1968

$$\text{var}(x) = \frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n-1} = \text{variance of } x$$

$$\text{var}(y) = \frac{\sum_{i=1}^n (y_i - \bar{y})^2}{n-1} = \text{variance of } y$$

$$\text{cov}(xy) = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{n-1} = \text{covariance of } xy$$

$\text{var}(T) = y^2 \text{var}(r) = \text{variance of the estimate of total}$

$T \pm t \sqrt{\text{var}(T)} = \text{confidence intervals for } T$

where t = standard normal deviate for appropriate confidence level

Procedures similar to those used to calculate State results were utilized to obtain estimates of the number of unacceptable sites in each region. These results are presented in Table 2. However, it should be noted that these regions are not identical to the EPA regions since some of the States and territories were not studied in the survey.

To obtain the regional calculations the combined ratio estimate method was used. In this method we computed unbiased estimates, \bar{x} and \bar{y} of the means of the X-values and of the Y-values in the universe as estimated from a stratified simple random sample. For our purposes the X-values were the number of unacceptable sites per county in 1972. The Y-values were the number of unacceptable sites per county in 1968. The universe is the region and the strata are the States in the region.

The actual formulas used in the combined ratio estimate method were:

$$\textcircled{1} \quad \bar{x} = \sum_{h=1}^n w_h \bar{x}_h$$

$$\bar{y} = \sum_{h=1}^n w_h \bar{y}_h$$

where \bar{x}_h = average number of unacceptable sites per county in State h in 1972

\bar{y}_h = average number of unacceptable sites per county in State h in 1968

$$w_h = \frac{N_h}{N} = \frac{\text{number of counties in State } h}{\text{number of counties in region}}$$

and n = number of States in region;

TABLE 2

Region	Estimated Total Sites in 1972	Variance of Est. of Total Dump Sites	95% Confidence Interval	80% Confidence Interval
Region I	1142	79.56640	1125-1159	1131-1153
Region II	1081	109.94390	1060-1102	1068-1094
Region III	966	226.00197	937-995	947-985
Region IV	3588	1566.96120	3510-3666	3537-3639
Region V	3502	1261.78080	3432-3572	3456-3548
Region VI	2345	2401.81675	2249-2441	2282-2408
Region VII	2243	190.33085	2216-2270	2225-2260
Region VIII	1453	150.80780	1429-1477	1437-1469
Region IX	490	129.99490	468-512	475-505
Region X	955	194.28480	928-982	937-973

$$\textcircled{2} \quad r = \frac{\bar{x}}{\bar{y}} = \text{number of unacceptable sites in 1972 for each unacceptable site in 1968;}$$

$$\textcircled{3} \quad \text{var}(r) = \sum_{h=1}^n w_h^2 \left(\frac{N_h - n_h}{N_h n_h} \right) S_{hu}^2$$

$$\text{where } S_{hu}^2 = S_{hx}^2 + r^2 S_{hy}^2 - 2r S_{hxy}$$

N_h = number of counties in State h

n_h = number of counties surveyed in State h

S_{hx}^2 = variance of unacceptable sites per county in State h in 1972

S_{hy}^2 = variance of unacceptable sites per county in State h in 1968

S_{hxy} = covariance of unacceptable sites per county in State h in 1968 and 1972

Finally a number of unacceptable sites existing in the Nation was projected. In these calculations as in those for regional estimates the combined ratio estimate method and the associated formulas were used. The results are shown in Table 3.

TABLE 3

Estimated number of sites in the Nation in 1972 = 17339

Variance of Estimate of Total Dump Sites = 7680.92960

95% Confidence Interval: 17,167-17,511

80% Confidence Interval: 17,227-17,451

In conclusion, there are a few points which should be made about the actual data and the analyses. First, a simple random sample of counties from each State was drawn and the properties associated with this type of sample hold. Second, some of the assumptions which were made in selecting the counties were as follows:

- (1) There is a relationship between the number of unacceptable sites observed in 1968 and those in 1972;
- (2) The same definition for "unacceptable" was used both in 1968 and in 1972;
- (3) The same criteria for identifying a land disposal site was used both in 1968 and 1972;
- (4) The purpose of the study was to determine the number of unacceptable sites in 1972.

It is very unlikely that an error in the third assumption will affect the results and in an example to follow it will be shown why an error of this type will have little effect on the final results. However, the one thing that could affect the results is a change in criteria during the 1968 survey. Third, it would have been desirable to survey more counties in some of the States in order to improve the reliability of the estimates. However, due to the limited manpower and time it was necessary to keep the sample size small enough so that the survey could be completed within the desired time limits. This does not mean that the survey estimates are invalid. It only means that a larger sample size would have resulted in less possibility of error.

There has been some concern expressed because the statistic used was a ratio of the number of unacceptable sites in 1972 to the number of unacceptable sites in 1968. The question was raised as to whether the results of the 1968 survey should have been used at all. To allay these fears, let me say that it is a standard statistical procedure to use as much previous data as possible to form a basis for a new study. This is what was done in the case of the Mission 5000 survey.

After the results of the survey were analyzed some concern was expressed that if the 1968 data was incorrect then the estimated totals for 1972 may be incorrect. It is very unlikely that an error in 1968 would have any effect on the present estimate of the total number of unacceptable sites. An example that should illustrate this point is as follows:

Suppose:

1. In 1968, State "X" reported 144 unacceptable sites whereas State "X" actually had 160 unacceptable sites (10% error). This error could be the result of negligence or the use of different criteria for identifying land disposal sites.
2. In 1972, a sample of five counties was selected. In 1968, these counties reported 27 unacceptable sites but they actually had 30 unacceptable sites. In 1972, it was found that these counties had 24 unacceptable sites.

Then the estimate of total unacceptable sites in 1972 is $\frac{24}{27} (144) = 128$ since the 1968 error is not known.

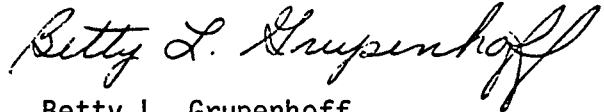
Suppose now that it was possible to redo the 1968 survey so that it was exactly correct.

Then the new estimate using the perfect 1968 figures would be $\frac{24}{30} (160) = 128$.

Therefore, assuming the same negligence was used in all counties within a State there is no basis for questioning the validity of the survey results. The assumption of uniform negligence within a State should be reasonable since normally one team performed all survey work within a State.

The only problem I see arises in trying to compare the results of the Mission 5000 survey in 1972 with the results of the 1968 National Survey. There are a number of reasons for this difficulty. First, the objective of this project was to estimate the total number of unacceptable sites existing in 1972 and not to determine whether there were more or less unacceptable sites than in 1968. Any attempt to compare the results in 1972 with those in 1968 in order to evaluate the effectiveness of Mission 5000 will be risky due to the potential error in the 1968 results. This study was not designed to measure the number of unacceptable sites that have been

closed since 1968. Even if the 1968 study was perfect and there were no sampling variation in 1972 data, a comparison of the results for 1968 and 1972 in order to determine the number of closed unacceptable sites is completely meaningless. The only way that this comparison would be valid is if no new unacceptable sites were opened since 1968.



Betty L. Grupenhoff
Statistician
Computer & Statistical Support Section
Assistance Branch
Systems Management Division

Attachment

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Solid Waste Management Programs

REPLY TO
ATTN OF:

AB, SMD

SUBJECT:

National Dump Site Survey

DATE:

August 8, 1972

TO:

Mr. Thomas A. Strickland
Mission 5000 Project Officer

I understand that there is some question as to how the counties were selected for the National Dump Site Survey. I will try to allay some of these fears by explaining how we made the sample selection.

First, we decided that approximately 1600 sites could be surveyed in the given time frame and with the personnel available for this project. This number of sites was arrived at by using an estimate of the average number of interviews that can be done in a day by each person.

Next we determined the number of substandard sites to be surveyed in each State. We used a combination of two different methods to accomplish this task. First, the 1600 site visits considered as reasonable for this project were apportioned to each State proportionate to the total number of existing substandard sites in the country; the data used for this allocation was the 1968 National Survey results.

In those States which were apportioned less than 30 interviews a second method was utilized to determine the sample sizes. From a statistical inference standpoint it is desirable to have at least 30 interviews from each State. The criteria used in this method was the following:

1. If 0-5 sites in a State, survey all.
2. If 6-61 sites in a State, survey 1/2 of them with a minimum of 5 sites per State.
3. If 61 or more sites in a State survey 30 sites.

Using this supplemental method, 320 interviews were added making a total of 1920 sites that needed to be surveyed. It is this method that we decided to use.

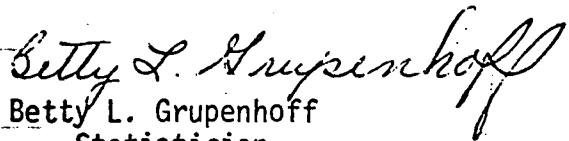
Having determined the number of sites to be surveyed from each State the next step was to pick the sites. It was decided prior to site selection that we would do a census of all sites in a selected county. This decision was made for the following reasons: to reduce travel time and to increase the number of sites that could be surveyed in the limited time.

All of the sites in each State were serialized. Then random numbers were selected. The sites corresponding to the selected random numbers were then determined. Once a site was chosen in a county all the sites in that county were considered. This selection method guarantees that the counties with the larger number of sites would have a greater probability of being selected.

The sites were randomly selected and therefore all of the properties associated with random selection will apply to the data obtained. It will be possible to obtain an estimate of both the average number of substandard sites per county in each State and the standard deviation of the numbers. From these county estimates of the number of substandard sites we will project a number of substandard sites for each State and confidence limits for the total estimate. No confidence limits will be possible if a judgment sample (i.e., the counties be selected on basis of subjective judgment) is used since we will not be able to obtain an estimate of the standard deviation.

I hope that I have been able to answer most of the questions that you may have and to instill some appreciation of the importance of maintaining the randomness of the sample by surveying the selected counties. If time is available to survey additional counties contact me and I'll randomly select more counties. You may survey counties which may be of particular interest to you but these counties will not be used in the estimates.

Please contact me if I can be of any further assistance.



Betty L. Grupenhoff
Statistician

Computer & Statistical Support Section
Assistance Branch
Systems Management Division

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Office of Solid Waste Management Programs

REPLY TO
ATTN OF:

TA 01.B.239/2

DATE: May 31, 1972

SUBJECT:

Sample Selection for Mission 5000

TO:

The Record

On May 18, 1972, Dan Greathouse and I met with Jack Hubbard and Don Kee to discuss a resurvey for Mission 5000. This meeting was a follow-up to one in which they requested that we select a sample of counties within each state for the purpose of resurveying the substandard disposal sites located in these counties to determine their current status. Using the results obtained from this sample of counties, a national profile will be developed.

At this earlier meeting, we agreed that the first step to be taken was to determine the total number of disposal sites and the number of substandard sites for each county within each state. Charles Hampel said that he would get this information from the National Survey data.

At the meeting on May 18, we made some estimates of the number of interviews that could be handled with the available manpower and within the desired time frame. There will be 10 full time people available from July 10 until September 10 to conduct the surveys. Assuming 20 working days a month, there will be a total of 40 working days per person for the project. Based on his past experience, Mr. Hubbard estimated that one person could visit 4 sites each working day. Using these figures we concluded that approximately 1,600 sites could be covered in the given time frame and with the personnel available for this project.

A combination of two different methods were used in determining the number of substandard sites to be surveyed within each state. First, the 1,600 site visits considered as reasonable for this project were apportioned to each state proportionate to the total number of existing substandard sites in the state vs. the total number of substandard sites in the country; the data used for this allocation was the 1968 National Survey results. It should be noted that there is no existing National Survey data for Nebraska and Wisconsin

and therefore no information to use in determining sample sizes. These states did not initially have grants to conduct a survey but since that time they have received grants. Wisconsin has finished its survey, but we do not have the data yet and Nebraska is just starting its survey.

In those states which were apportioned less than 30 interviews, a second method was utilized to determine the sample sizes. From a statistical inference standpoint, it is desirable to have at least 30 interviews from each state. The criteria used in this method was the following:

- 1) If 0-5 sites in a state, survey all
- 2) If 6-60 sites in a state, survey 1/2 of them with a minimum of 5 sites per state
- 3) If 61 or more sites in a state, survey 30 sites

Using this supplemental method, an additional 324 interviews were added making a total of 1,924 sites that need to be surveyed. This was the method we recommended. It, as well as the first method, was established on the basis that a census of all sites in a selected county would be taken. This census was decided upon by Messrs. Hubbard and Kee.

On May 18, Messrs. Hubbard and Kee expressed concern that the number of sites was too large. They decided to check with some of the planners and see if the data from some state surveys are current enough to eliminate the need to resurvey these states.

Since the last meeting, Messrs. Hubbard and Kee have decided that the recommended sampling procedure is realistic and they are going to use it. Today they told us to start selecting counties to obtain the desired 1924 sites.

After we select the counties to be surveyed, Mr. Hampel has agreed to furnish us with a list of the names and addresses of all the sites in the selected counties as they are reported in the National Survey.

Betty L. Grupenhoff

Betty L. Grupenhoff
Statistician

Computer & Statistical Support Section
Assistance Branch

APPENDIX B

The Land Disposal Site Investigation Report is the form utilized in the 1972 National Dump Site Survey. Note that only certain pertinent items were completed.

COMMUNITY SOLID WASTES PRACTICES
LAND DISPOSAL SITE INVESTIGATION REPORT

2

1. STATE [] [] [] [] [] [] [] [] [] []
2. COUNTY [] [] [] [] [] [] [] [] [] []
3. SITE LOCATION (Political Jurisdiction) [] [] [] [] [] [] [] [] [] []

4. NAME OF SITE []
5. ADDRESS OF SITE []
6. DATE OF SURVEY []

7. NAME OF PERSON COMPLETING FORM []
8. TITLE []
9. ORGANIZATION AND ADDRESS []

10. POLITICAL JURISDICTIONS SERVED BY LAND DISPOSAL SITE

NAME OF POLITICAL JURISDICTION	ESTIMATED PERCENTAGE OF JURISDICTION SERVED BY SITE	AVERAGE DISTANCE OF SITE FROM CENTER OF SOURCE AREA (Miles)	
[] []	[] []	[] []	<input type="checkbox"/> PUBLIC AGENCY <input type="checkbox"/> PRIVATE AGENCY
[] []	[] []	[] []	<input type="checkbox"/> PUBLIC AGENCY <input type="checkbox"/> PRIVATE AGENCY

FOR ADDITIONAL ENTRIES, CHECK HERE (53) AND MAKE ENTRIES IN ITEM #45

11. SITE OPERATED BY []
12. SITE OWNED BY []
13. IS OPERATION REGULATED BY A HEALTH AUTHORITY? YES NO IF YES, INDICATE LEVEL OF PRINCIPAL AUTHORITY: COMMUNITY STATE COUNTY OTHER (Specify) []

14. GENERAL CHARACTER OF SITE (Check one only)
 QUARRY OR BORROW PIT HILLSIDE
 GULLY-CANYON MARSH, TIDELAND OR FLOOD PLAIN
 LEVEL AREAS
 OTHER (Specify) []
15. YEAR SITE PLACED IN OPERATION []
16. ANTICIPATED LIFE REMAINING (Years) []
17. TOTAL AREA OF SITE (Acres) []
18. AREA TO BE USED FOR LAND DISPOSAL (Acres) []

19. ZONING/ LAND USE SURROUNDING FACILITY (Check predominant type only)
ZONING: NONE INDUSTRIAL RESIDENTIAL AGRICULTURAL
 RESIDENTIAL AGRICULTURAL COMMERCIAL INDUSTRIAL
 COMMERCIAL OTHER (Specify) []
LAND USE: AGRICULTURAL OTHER (Specify) []

20. IS USE OF SITE PLANNED? YES NO IF YES, CHECK PREDOMINANT USE ONLY: RECREATIONAL AREA OR PARK LIGHT CONSTRUCTION AGRICULTURE USE NOT DETERMINED
 PARKING LOT HEAVY CONSTRUCTION OTHER (Specify) []

21. WILL PUBLIC AGENCY CONTROL COMPLETED SITE USE? YES NO
22. MATERIAL USED FOR COVER (Check one only): NONE OTHER (Specify) []
 EARTH

23. FREQUENCY OF COVER (Check one only): NONE DAILY (Except face) DAILY (End of each working day) OTHER (Specify) []
24. IS SPREADING AND COMPACTION OF REFUSE HANDLED IN APPROXIMATELY TWO-FOOT LAYERS OR LESS? YES NO

25. NUMBER OF DAYS DISPOSAL SITE COULD NOT BE USED BECAUSE OF WEATHER CONNECTED CONDITIONS (Enter average per year) []

26. GENERAL CHARACTER OF OPERATION (Judgment evaluation - check appropriate categories)

APPEARANCE	IS BLOWING PAPER CONTROLLED?	IS BLOWING PAPER CONSIDERED TO BE A NUISANCE?	ROUTINE BURNING	ARE THERE SURFACE DRAINAGE PROBLEMS?	ARE THERE LEACHING PROBLEMS?
<input type="checkbox"/> SLIGHTLY <input type="checkbox"/> UNSIGHTLY	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> NONE <input type="checkbox"/> UNCONTROLLED <input type="checkbox"/> PLANNED AND LIMITED	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO
15	16	17	18	19	20

LAND DISPOSAL SITE INVESTIGATION REPORT (Page 2)

7. CONTROL PROGRAMS		YES	NO	Do not use	29. IS LOWEST PART OF FILL IN WATER TABLE? <input type="checkbox"/> YES <input type="checkbox"/> NO						
RODENT CONTROL PROGRAM	NEEDED	<input type="checkbox"/>	<input type="checkbox"/>	21	29. FIRE PROTECTION <input type="checkbox"/> NONE <input type="checkbox"/> WATER <input type="checkbox"/> FIREBREAK <input type="checkbox"/> OTHER _____ (Specify)						
	PROVIDED	<input type="checkbox"/>	<input type="checkbox"/>	22							
FLY CONTROL PROGRAM	NEEDED	<input type="checkbox"/>	<input type="checkbox"/>	23	30. NUMBER OF TIMES FIRE CONTROL EQUIPMENT WAS REQUIRED AT SITE IN THE PAST YEAR <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td><td> </td><td> </td></tr><tr><td>33</td><td>34</td><td>35</td></tr></table>				33	34	35
33	34	35									
PROVIDED	<input type="checkbox"/>	<input type="checkbox"/>	24	31. IS SALVAGING PERMITTED? <input type="checkbox"/> YES <input type="checkbox"/> NO							
BIRD CONTROL PROGRAM	NEEDED	<input type="checkbox"/>	<input type="checkbox"/>	25	32. IS SALVAGING PRACTICED? <input type="checkbox"/> YES <input type="checkbox"/> NO						
	PROVIDED	<input type="checkbox"/>	<input type="checkbox"/>	26							
DUST CONTROL PROGRAM	NEEDED	<input type="checkbox"/>	<input type="checkbox"/>	27	33. ESTIMATED NUMBER OF LOADS DEPOSITED DAILY (Average)						
	PROVIDED	<input type="checkbox"/>	<input type="checkbox"/>	28							
ODOR CONTROL PROGRAM	NEEDED	<input type="checkbox"/>	<input type="checkbox"/>	29	FROM PUBLIC COLLECTION VEHICLES (Enter number) <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td><td> </td><td> </td></tr><tr><td>38</td><td>39</td><td>40</td></tr></table>				38	39	40
38	39	40									
PROVIDED	<input type="checkbox"/>	<input type="checkbox"/>	30	FROM PRIVATE COLLECTION VEHICLES (Enter number) <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td><td> </td><td> </td></tr><tr><td>41</td><td>42</td><td>43</td></tr></table>				41	42	43	
41	42	43									
					FROM OTHER VEHICLES (Enter number) <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td><td> </td><td> </td></tr><tr><td>44</td><td>45</td><td>46</td></tr></table>				44	45	46
44	45	46									

34. ARE QUANTITATIVE RECORDS KEPT IN ANY FORM? <input type="checkbox"/> YES <input type="checkbox"/> NO	Do not use 47	37. CHECK ANY ITEMS LISTED BELOW WHICH ARE EXCLUDED FROM THE DISPOSAL SITE																
35. QUANTITIES OF SOLID WASTES RECEIVED ANNUALLY		<input type="checkbox"/> ALL PUTRESCIBLES 15 <input type="checkbox"/> ALL NON-COMBUSTIBLES 16 <input type="checkbox"/> ALL COMBUSTIBLES 17 <input type="checkbox"/> GARBAGE 18 <input type="checkbox"/> DEAD ANIMALS 19 <input type="checkbox"/> WASTE OIL 20 <input type="checkbox"/> SEWAGE SOLIDS 21 <input type="checkbox"/> JUNKED AUTOMOBILES 22 <input type="checkbox"/> LARGE APPLIANCES 23 <input type="checkbox"/> DEMOLITION WASTES 24 <input type="checkbox"/> CONSTRUCTION DEBRIS 25 <input type="checkbox"/> STREET SWEEPINGS 26 <input type="checkbox"/> TIRES 27 <input type="checkbox"/> HAZARDOUS MATERIALS 28 <input type="checkbox"/> OTHER (Specify) 29 <input type="checkbox"/> OTHER (Specify) 31 <input type="checkbox"/> OTHER (Specify) 33																
TONS WEIGHED	<table border="1" style="display: inline-table;"><tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr><tr><td>48</td><td>49</td><td>50</td><td>51</td><td>52</td><td>53</td><td>54</td><td> </td></tr></table>										48	49	50	51	52	53	54	
48	49		50	51	52	53	54											
TONS ESTIMATED	<table border="1" style="display: inline-table;"><tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr><tr><td>55</td><td>56</td><td>57</td><td>58</td><td>59</td><td>60</td><td>61</td><td> </td></tr></table>									55	56	57	58	59	60	61		
55	56	57	58	59	60	61												
CUBIC YARDS	<table border="1" style="display: inline-table;"><tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr><tr><td>62</td><td>63</td><td>64</td><td>65</td><td>66</td><td>67</td><td>68</td><td>69</td></tr></table>									62	63	64	65	66	67	68	69	
62	63	64	65	66	67	68	69											
36. GENERAL CLASSIFICATION OF SOLID WASTES ACCEPTED AT DISPOSAL SITE (Check those accepted)																		
<input type="checkbox"/> HOUSEHOLD 70	<input type="checkbox"/> INDUSTRIAL 72	<input type="checkbox"/> INSTITUTIONAL 74																
<input type="checkbox"/> COMMERCIAL 71	<input type="checkbox"/> AGRICULTURAL 73	<input type="checkbox"/> INCINERATOR RESIDUE ONLY 75																

38. EQUIPMENT AVAILABLE (Average utilized daily)	NUMBER	39. TOTAL NUMBER OF EMPLOYEES ON SITE (Average daily) <table border="1" style="display: inline-table;"><tr><td> </td><td> </td></tr><tr><td>49</td><td>50</td></tr></table>			49	50																
49	50																					
DRAGLINE OR SHOVEL-TYPE EXCAVATORS	<table border="1" style="display: inline-table;"><tr><td> </td><td> </td></tr><tr><td>35</td><td>36</td></tr></table>			35	36	40. HOURS OF DAILY OPERATION (On a 24-hour clock) BEGIN <table border="1" style="display: inline-table;"><tr><td> </td><td> </td></tr><tr><td>51</td><td>52</td></tr></table> END <table border="1" style="display: inline-table;"><tr><td> </td><td> </td></tr><tr><td>53</td><td>54</td></tr></table>			51	52			53	54								
35	36																					
51	52																					
53	54																					
SCRAPERS (Self-propelled)	<table border="1" style="display: inline-table;"><tr><td> </td><td> </td></tr><tr><td>37</td><td>38</td></tr></table>			37	38	41. NUMBER OF DAYS OPERATED PER WEEK <table border="1" style="display: inline-table;"><tr><td> </td></tr><tr><td>55</td></tr></table>		55														
37	38																					
55																						
TRACTORS (Track or Rubber Tire) (Bulldozer or High Lift Loader)	<table border="1" style="display: inline-table;"><tr><td> </td><td> </td></tr><tr><td>39</td><td>40</td></tr></table>			39	40	42. ANNUAL OPERATING COST (Including supervision and equipment maintenance) \$ <table border="1" style="display: inline-table;"><tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr><tr><td>56</td><td>57</td><td>58</td><td>59</td><td>60</td><td>61</td><td>62</td><td> </td></tr></table>									56	57	58	59	60	61	62	
39	40																					
56	57	58	59	60	61	62																
TRUCKS	<table border="1" style="display: inline-table;"><tr><td> </td><td> </td></tr><tr><td>41</td><td>42</td></tr></table>			41	42	43. IS THIS A SANITARY LANDFILL? <input type="checkbox"/> YES <input type="checkbox"/> NO																
41	42																					
OTHER _____ (Specify)	Do not use 43 44 45																					
OTHER _____ (Specify)	Do not use 46 47 48																					

44. IF SOURCES OTHER THAN REPORTER DESIGNATED IN ITEM 7 WERE UTILIZED IN COMPLETING THIS FORM, INDICATE BELOW THE SOURCES USED AND ITEM NUMBERS

NAME OF PERSON	TITLE	ORGANIZATION	ITEM NUMBER(S)

