

1 SURVEY OBJECTIVES, KEY VARIABLES, AND OTHER PRELIMINARIES

1(a) Survey Objectives

For CWNS 2012, states will have the option to use the “Traditional” CWNS Method or a new “Gap Approach” option. The primary objective of the statistical methods applied in Section B of this information collection is for EPA to identify and select a sample of wastewater systems that is representative of systems within each state that chooses to participate in the GAP Approach to estimate the needs for the 2012 CWNS. For the selected sample of wastewater systems, states will collect information about asset inventory that will be used by EPA to estimate asset replacement cost. The representativeness of this sample of systems at the state level is critical to the CWNS because the estimated costs will be used to generate the CWNS Report to Congress, which presents costs data at the state level.

1(b) Key Variables

The key variables associated with selecting a representative sample of wastewater systems at the state level are: system size (by population served), CWNS 2008 needs, and system type (i.e., combined sewer system or separate sewer system).

1(c) Statistical Approach

In the previous data collection efforts for the CWNS a census approach (Traditional Approach) was used. For the CWNS 2012 EPA is providing states the option of using a more compressive infrastructure GAP Approach to estimate the needs for wastewater systems. This new approach will require participating states to submit significantly more information for each system, so selection of a sample of systems for participation allows for significant burden and costs savings as compared to a census approach.

1(d) Feasibility

EPA anticipates that the survey (the statistical sample) objectives are achievable given the existing time and resource constraints.

- State participation in the GAP Approach for CWNS is voluntary.
- There will be an electronic version of the form (with picklists and calculations coded in).
- The statistical approach to this data collection requires only a fraction of systems to complete the GAP form, resulting in equivalent or smaller cost and burden at the state level than would be incurred if all systems participate in CWNS
- The survey results will be completed in time to inform the corresponding cycle of CWNS.

2 SURVEY DESIGN

2(a) Target Population and Coverage

Existing public wastewater systems are the target population for CWNS GAP Approach methodology.

2(b) Sample Design

2(b)(i) Sampling Frame

For each participating state, EPA will develop the sample frame for the statistical selection of wastewater systems. Initial data will be pulled from the 2008 CWNS. Only those systems in operation in 2008, expected to be in operation in the future, and reporting documented needs were used to estimate the sample characteristics, but the sample size calculations was applied to all wastewater systems, regardless of their reporting of needs. The initial universe will be adjusted to account for known anomalies inventory reporting (For example, states will be able to inform EPA about existing systems that were not entered in the 2008 CWNS or that were entered but not submitted for review).

2(b)(ii) Sample Size

Final sample sizes for participating states will be determine once the state makes a decision to be part of the GAP Approach methodology. Preliminary sample sizes were estimated by EPA and are presented in Appendix A. The sample design limits strata with less than 10,000 people to having a maximum error of 80% and strata of more than 10,000 people to having a maximum error of 40%. All facilities in the state's top 3% based on population will be included in the sample frame.

Typical sample rates are expected to be:

- 10-25% for facilities serving less than 10,000 people
- 30-60% for facilities serving between 10,000 and 100,000 people
- 100% (census survey) for the largest 3% of facilities in each state

2(b)(iii) Stratification Variables

In developing the representative sample, EPA considers factors such as population served and geographic location. For each state the sample systems will be stratified by population served (system size).

2(b)(iv) Sampling Method

The proposed sampling design is stratified random sampling. For each state the number of strata and stratification limits will be determined based on the population characteristics of the state and a representative sample of systems from each of the strata will account for different system sizes. EPA will include at least three systems from each stratum for each state.

2(b)(v) Multi-Stage Sampling

EPA does not anticipate the need for multi-stage sampling. Wastewater systems statuses often change little over short periods of time, so significant changes from the 2008 are not expected.

2(c) Precision Requirements

2(c)(i) Precision Targets

For each state the sample design is selected based on two conditions:

- The total needs would be estimated within close to ± 10 percent of the amount of the true need within a 95% confidence interval, and
- Each stratum consisting of less than 10,000 people would have an error of ± 80 percent, and each stratum consisting of more than 10,000 people would have an error of ± 40 percent.

For most states one of the two conditions above drives the sample design. In cases where the individual stratum error drives the results, the total error will be less than 10 percent. Alternatively, where the total error drives the results, states will have stratum errors that are less than the 80 percent or 40 percent bounds.

2(c)(ii) Non-sampling error

Systems that do not complete the questionnaire will be considered as systems without justification for needs, and will be included as such in the analysis. This is consistent with how these facilities are handled in the CWNS Traditional Method. Given that many less facilities are involved under the Gap Approach, states utilizing the gap approach will have a much greater ability to follow up with facilities on completing the form. Since non-completion of questionnaire will be assessed as a system not having justification for needs, and since CWNS 2012 results may be used to determine states' Clean Water State Revolving Fund allocations, states will have a high incentive to obtain very close to 100% form completion.

2(d) Questionnaire Design

The GAP Data Request form was design to minimize data entry by pre-populating it with data currently in the CWNS DEP. See Appendix B for the draft form.

Other features of the form are:

- The form will have optional extra pages for entering additional asset inventory (section 5) information.
- The form will have a companion (~2 page) instructions document.
- There will be an electronic, editable version of the form (with picklists and calculations coded in). Like the hard copy form, this electronic Gap Approach form will be pre-populated with the most current CWNS data.

- Asset replacement costs are not requested in any versions of the form. These costs will be calculated in the CWNS DEP based on other data entered in the form
- All data in the form is required, except where indicated by the italic text (several rows in page 4 tables, and far right 3 table columns on pages 5-7)

The form is divided into 6 sections, each with data item request that meet a clear and specific objective:

Sections 1 to 4: Basic system data. These four sections provide the information necessary to identify and characterize the system. Most of the information will be pre-populated but the respondents will have the ability to change any of the data items.

Section 5: Revenues and Expenses. Data items in this section are necessary to analyze the financial situation of the system. Most data item are voluntary with only the totals denoted as mandatory.

Section 6: Asset Inventory. This is the most extensive section of the questionnaire and will allow EPA to estimate the type of asset, anticipated failure and replacement or rehabilitation costs. The data items required should be readily available to most operators or managers.

Section 7: Certification. Signature requirements guarantee the validity of the data. EPA is implementing a tiered certification with smaller systems having less stringent requirements.

3 PRETESTS AND PILOT TESTS

The “Gap Approach” option is modeled after an asset management needs assessment approach used in Pennsylvania’s 2008 Governor’s Report on Sustainable Infrastructure. For the 2008 CWNS, the state of Pennsylvania, in collaboration with EPA, conducted a sample of their wastewater systems and estimated their infrastructure needs using a GAP methodology approach. This study in Pennsylvania served as the pilot test for the nationwide CWNS GAP initiative to be included in the 2012 CWNS. The original Form used in Pennsylvania has been modified based on lessons learned and input from the other states that are interested in using the GAP methodology for 2012.

4 COLLECTION METHODS AND FOLLOW-UP

4(a) Collection Methods

CWNS coordinators from states participating in the GAP approach methodology will have flexibility to choose the collection method that best fits the characteristics of their state. EPA is providing multiple options and flexibility to facilitate the data collection effort by states:

- Forms will be pre-populated with data currently in the 2008 CWNS.
- Forms will have a barcode CWNS ID #, so that forms faxed in can be connected for facilities within the CWNS DEP.

- There will be either an electronic version of the form (with picklists and calculations coded in)

4(b) Survey Response and Follow-up

High compliance levels (97%) during Pennsylvania's effort in 2008 have given EPA confidence that equivalent levels can be achieved during 2012 in other states. EPA plans to continue outreach and compliance assistance efforts, as needed.

5 ANALYZING AND REPORTING SURVEY RESULTS

5(a) Data Preparation

States are ultimately responsible for collecting and entering the information into the CWNS DEP and for the quality of the data entered. The DEP is equipped with automatic error checks to identify systems that fall outside certain normal parameter and during the data entry period of the CWNS 2012 EPA and its contractors will perform reviews of the information and documentation submitted.

5(b) Analysis

Data collected with the Gap Approach will be analyzed alongside other CWNS data to develop a much more complete picture of wastewater facility sustainability, with state level estimates on capital and O&M needs, revenues, and gaps projected over 20 years.

5(c) Reporting Results

Capital needs from the Gap Approach will be reported alongside Traditional Method capital needs in the CWNS 2012 Report to Congress. Additionally, a new section will be added to the Report that summarizes data from states participating in the Gap Approach to draw sustainable infrastructure conclusions (e.g. the gap between projected capital and O&M needs and expected revenues).

Appendix A – Draft Sample Sizes by State

	< 10 K					> 10 K					Total				
	N (systems)	n (systems)	n/N, % (systems)	N (Facilities)	n (facilities estimated)	N (systems)	n (systems)	n/N, % (systems)	N (Facilities)	n (facilities estimated)	N (systems)	n (systems)	n/N, % (systems)	N (Facilities)	n (facilities estimated)
AL	218	26	11.9%	223	28	55	18	32.7%	62	20	273	44	16.1%	285	48
AR	336	279	83.0%	376	315	36	36	100.0%	62	62	372	315	84.7%	438	377
AZ	52	7	13.5%	61	9	48	21	43.8%	88	55	100	28	28.0%	149	64
CA	51	12	23.5%	54	13	110	28	25.5%	260	113	161	40	24.8%	314	126
CO	203	52	25.6%	212	56	26	26	100.0%	31	31	229	78	34.1%	243	87
CT	44	17	38.6%	55	23	35	28	80.0%	63	51	79	45	57.0%	118	74
DE	13	9	69.2%	23	17	3	3	100.0%	12	12	16	12	75.0%	35	29
FL	173	17	9.8%	177	20	178	43	24.2%	240	85	351	60	17.1%	417	105
GA	259	12	4.6%	275	15	41	14	34.1%	60	27	300	26	8.7%	335	42
ID	147	25	17.0%	164	30	16	12	75.0%	38	29	163	37	22.7%	202	59
IL	509	252	49.5%	535	262	76	64	84.2%	160	143	585	316	54.0%	695	405
IN	284	250	88.0%	303	269	19	19	100.0%	28	28	303	269	88.8%	331	297
IA	709	136	19.2%	722	142	19	19	100.0%	37	37	728	155	21.3%	759	179
KS	580	246	42.4%	598	252	35	22	62.9%	81	59	615	268	43.6%	679	311
KY	122	26	21.3%	143	35	30	26	86.7%	44	39	152	52	34.2%	187	74
LA	121	26	21.5%	141	31	33	15	45.5%	57	27	154	41	26.6%	198	58
MA	64	20	31.3%	69	22	34	15	44.1%	76	42	98	35	35.7%	145	64
MD	118	17	14.4%	140	24	27	15	55.6%	52	31	145	32	22.1%	192	55
ME	97	63	64.9%	110	74	4	4	100.0%	9	9	101	67	66.3%	119	83
MI	324	90	27.8%	371	114	65	52	80.0%	336	296	389	142	36.5%	707	410
MN	108	12	11.1%	124	16	27	21	77.8%	150	140	135	33	24.4%	274	156
MO	619	242	39.1%	689	269	44	42	95.5%	123	121	663	284	42.8%	812	390
MS	268	113	42.2%	316	136	35	32	91.4%	117	110	303	145	47.9%	433	246
MT	116	42	36.2%	121	46	8	8	100.0%	15	15	124	50	40.3%	136	61
NC	240	13	5.4%	338	21	73	27	37.0%	198	82	313	40	12.8%	536	103
NE	449	198	44.1%	451	200	12	12	100.0%	15	15	461	210	45.6%	466	215
NH	69	38	55.1%	77	42	12	12	100.0%	28	28	81	50	61.7%	105	70
NJ	67	7	10.4%	90	10	70	53	75.7%	284	245	137	60	43.8%	374	255
NV	31	12	38.7%	34	15	11	10	90.9%	37	36	42	22	52.4%	71	51
NY	433	32	7.4%	527	48	67	36	53.7%	194	113	500	68	13.6%	721	161
OH	503	256	50.9%	623	326	88	78	88.6%	178	161	591	334	56.5%	801	487
OK	446	266	59.6%	448	267	39	32	82.1%	46	39	485	298	61.4%	494	306
OR	86	39	45.3%	90	42	36	16	44.4%	75	42	122	55	45.1%	165	84
PA	589	262	44.5%	818	396	104	99	95.2%	337	324	693	361	52.1%	1,155	720
PR	18	6	33.3%	19	7	25	9	36.0%	25	9	43	15	34.9%	44	16
SC	136	103	75.7%	148	115	17	17	100.0%	45	45	153	120	78.4%	193	160
SD	20	12	60.0%	20	12	5	5	100.0%	5	5	25	17	68.0%	25	17
TN	182	128	70.3%	202	144	54	48	88.9%	85	76	236	176	74.6%	287	220
TX	291	15	5.2%	318	19	149	65	43.6%	382	227	440	80	18.2%	700	246
UT	80	14	17.5%	97	19	23	12	52.2%	94	63	103	26	25.2%	191	82
VA	176	11	6.3%	258	18	42	26	61.9%	103	68	218	37	17.0%	361	86
VT	62	43	69.4%	70	51	3	3	100.0%	5	5	65	46	70.8%	75	56
WA	59	10	16.9%	69	14	19	10	52.6%	43	27	78	20	25.6%	112	41
WI	531	77	14.5%	669	105	56	40	71.4%	263	225	587	117	19.9%	932	330
WV	176	54	30.7%	201	67	11	11	100.0%	27	27	187	65	34.8%	228	94
WY	84	75	89.3%	92	83	11	11	100.0%	25	25	95	86	90.5%	117	108
TOTAL	9,939	3,572	35.9%	11,290	4,125	1,866	1,163	62.3%	4,359	3,173	11,805	4,735	40.1%	15,649	7,708