

UNITED STATES OF AMERICA
POSTAL REGULATORY COMMISSION
WASHINGTON, DC 20268-0001

Before Commissioners:

Dan G. Blair, Chairman;
Nanci E. Langley, Vice Chairman;
Mark Acton
Ruth Y. Goldway; and
Tony L. Hammond

Modification of Analytic Principles
Used in Periodic Reporting

Docket No. RM2009-5

Public Representative Comments in Response to Order No. 229

July 15, 2009

On June 24, 2009, the Commission issued Order No. 229 requesting comments on the Postal Service's Proposal One to make a change in the analytical methods approved for use in periodic reporting. The analytical change proposes to reduce by 20% the sample size it uses to collect Origin-Destination Information System/Revenue Pieces and Weight (ODIS/RPW) data beginning in the first quarter of FY 2010. Out of the current annual full sample of 128,000 tests the Postal Service proposes to eliminate 25,600 tests. Through this reduction in sample size the Postal Service posits it will save approximately \$6 million annually in data collection costs. The Postal Service maintains that the reduction in accuracy (precision) of some product estimates of volume, revenue, cost per piece, and cost coverage is slight. Tables 1 and 2 in Proposal One show the expected impact of the proposed sample size reduction on the coefficients of variation (CVs) for volume, revenue, cost per piece, and cost coverage for the major categories of single-piece mail.

Generally, two types of cost considerations exist in selecting an appropriate sample size within the sampling process and they include a.) data collection costs, and b.) costs incurred when the estimate is erroneous. Ideally, the sample size should minimize the total costs of sampling including both types of cost considerations. The Postal Service estimates that the annual savings in data collection costs from a 20% reduction in sample size is \$6 million. Data collection costs are fairly straightforward to calculate. The difficulty for statisticians as well as for the Postal Service in Proposal One, is to estimate the costs incurred when the estimates for volume, revenue, costs per piece, and cost coverage derived from the sample are erroneous. In estimating sampling error costs, it is desirable to achieve a balance between the chances of

making an error, and the costs of those errors. In the case of Proposal One, that would include achieving a balance between making an error in the estimation of volume, revenue, cost per piece, and cost coverage, and the costs of those errors to the Postal Service and mailers. This is what the Postal Service has attempted to do to some degree. The Postal Service uses a Coefficient of Variation (CV) comparison analysis to shed light on possibilities for a balance between the chances of making an error and the costs of those errors for the estimation of volume, revenue, cost per piece, and cost coverage for the major classes of single-piece mail. The Public Representative maintains that the Postal Service missed the opportunity using the same data they have presented to expand their analyses for more useful decision-making information.

This analysis uses interchangeably the terms “confidence” and “reliability”, as well as “tolerable error”, “precision”, and “accuracy”, even though it is recognized that the terms are not completely synonymous, and furthermore, are used in different phases of the sampling process. The sampling process includes a *planning phase* and an *analytical/conclusions phase*. But in the case of Proposal One the analysis uses past (FY2008 samples) samples from an analytical/conclusions phase, as well as presumably random reductions in past samples for planning purposes.

Proposal One gives 128,000 as the total number of ODIS-RPW tests conducted annually, but 128,000 is unfortunately not further sub-divided into the major categories of single-piece mail in the Postal Service's analysis. Thus, it is unknown how many of the 128,000 tests are in each of the “Full” sample single-piece mail categories, and how many of the 128,000 minus 25,600 tests are in each of the “20% Reduction” sample categories. However, the analysis does present units-free CVs for each category for

volume, revenue, cost per piece, and cost coverage. The Postal Service's CVs are reproduced in the first 4 columns of Tables 1-10 of this analysis and are located at the end of these comments.

As can be seen in all categories of single-piece mail the CVs increase, or stay the same in a few cases, when the sample size is reduced. The Postal Service notes that precision goes down (CVs increase) slightly for some categories of single-piece mail. It is to be expected that if sample size is reduced the precision of the estimates calculated from the sample will decrease. The Postal Service asserts that this decrease is slight, but in actuality it depends on how confident the analyst wants to be with the calculated sample estimates as well as how much error the analyst is willing to tolerate in the sample estimates. Answers to these questions occur in the planning phase of the sampling process and the answers to those questions are facilitated by having information in monetary terms. Proposal One does not present the impact of a 20% reduction in sample size in monetary terms for errors in volume, revenue, cost per piece, and cost coverage estimates.

The CVs calculated by the Postal Service do, however, offer some analytical possibilities involving the calculation of the minimum sample size required at various "confidence" (reliability target) and "precision" level combinations for the FY2008 "Full" and "20% Reduction" samples for the major categories of single-piece mail for volume, revenue, cost per piece, and cost coverage estimates. The following formula is used to calculate minimum sample sizes using the CVs and the results are shown in Tables 1-6:

$$\text{Sample size} = ((\text{CV})^2 * (\text{reliability target})^2) / (\text{tolerable error})^2$$

As expected, to remain within the same confidence (reliability) and precision combination the minimum sample size needed for the CVs given by the Postal Service for the 20% Reduction cases must increase. The CVs for the 20% Reduction samples are higher, and the minimum sample size required to stay within the same reliability target and precision level, must increase. In the absence of information on the actual number of tests in each category and since CVs are units-free, the actual numbers for the minimum sample sizes in the tables are not meaningful in *absolute* terms only the *relative* differences between the sample sizes have meaning in this analysis.

The Postal Service also states that the greatest impact of the sample size reduction is in the First-Class Mail categories, so additional analysis (sensitivity tests) presented in Tables 7-10, is discussed only for the four First-Class Mail categories. A 95% confidence interval and a 95% precision level is assumed as a starting point for the sensitivity tests. This means that using the minimum sample size required in a sample-based study will give the analyst 95% confidence that the calculated estimate will be the true estimate as well as represent the analysts' willingness to accept 5% error (95% precision) in the estimates. In Tables 7 and 8, the level of precision is decreased from the starting point combination, while the confidence interval remains at 95%. In Tables 9 and 10, the confidence interval decreases while the level of precision remains at 95%. In all 4 tables (Tables 7-10), the Full sample size values are reduced by 20% in columns (9) and (11) for the first 4 First-Class Mail categories, then this reduced sample size is compared to the lesser confidence (reliability) or precision combinations to the left in the

table to find where it best fits. The results of all the comparisons are presented in the table below:

Sensitivity Test Results on the Reliability and Precision of the Reduced Sample Estimates (taken from Tables 7-10)		
	Percentage Decrease in Precision	Percentage Decrease in Reliability
First-Class Single-Piece Letters	1%	4%
First-Class Single-Piece Cards	1%	4%
First-Class Flats	1%	4%
First-Class Parcel	1%	4%

In Tables 7 and 8, the Full sample sizes in columns (9) and (11) are reduced by 20% and then compared and found to best fit within the next reliability-precision combination to the left where precision is reduced by 1% for all of the First-Class Mail categories analyzed for volume, revenue, cost per piece, and cost coverage.

Comparing Tables 8 and 9, the Full sample sizes in columns (9) and (11) are again reduced by 20%, but this time when compared are found to best fit within the reliability-precision combination to the left where reliability is reduced by 4% for all of the First-Class Mail categories analyzed for volume, revenue, cost per piece, and cost coverage.

In conclusion, the Public Representative would encourage the Postal Service to further investigate what a sample size reduction in Origin-Destination Information System/Revenue Pieces and Weight (ODIS/RPW) data may mean in terms of both precision and reliability, and if possible, in monetary terms as well. If it is necessary for

the Postal Service to go ahead with an ODIS-RPW sample size reduction, the Commission may want to recommend that the reduction be something less than 20% with a continued monitoring of reliability and precision along the way that may help guide the Postal Service to further sample size reductions.

Respectfully Submitted,

Diane K. Monaco
Public Representative

901 New York Avenue, NW
Suite 200
Washington, D.C. 20268-0001
202-789-6849
diane.monaco@prc.gov

Table 1: Minimum Sample Size Required for 90% Confidence at Various Precision Levels for USPS Expected Coefficients of Variation (CVs) for ODIS-RPW Revenue and Volume Samples																
90% Confidence Level (or reliability target)																
	Coefficient of Variation (CV) from Table 1 in USPS RM2009-5				Minimum Sample Size Required for 90% Precision (or 10% tolerable error)				Minimum Sample Size Required for 95% Precision (or 5% tolerable error)				Minimum Sample Size Required for 98% Precision (or 2% tolerable error)			
	Revenue		Volume		Revenue		Volume		Revenue		Volume		Revenue		Volume	
	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction
First-Class Single-Piece Letters	0.26	0.31	0.35	0.43	18	26	33	50	73	104	133	200	457	650	829	1251
First-Class Single-Piece Cards	1.46	1.50	1.47	1.51	577	609	585	617	2307	2435	2339	2468	14420	15221	14619	15425
First-Class Flats	1.16	1.16	1.44	1.44	364	364	561	561	1456	1456	2244	2244	9103	9103	14028	14028
First-Class Parcel	1.73	1.79	2.31	2.39	810	867	1444	1546	3240	3468	5776	6183	20247	21676	36099	38643
Package Services Single Piece Parcel Post	1.00	1.04	1.11	1.15	271	293	333	358	1082	1171	1334	1431	6765	7317	8335	8947
Package Services Bound Printed Matter Flats	0.18	0.19	0.07	0.08	9	10	1	2	35	39	5	7	219	244	33	43
Package Services Bound Printed Matter Parcels	0.15	0.16	0.08	0.08	6	7	2	2	24	28	7	7	152	173	43	43
Package Services Media and Library Mail	0.59	0.61	0.53	0.54	94	101	76	79	377	403	304	316	2355	2517	1900	1973
Priority Mail	0.41	0.43	0.93	0.97	45	50	234	255	182	200	936	1018	1137	1251	5851	6365

Table 2: Minimum Sample Size Required for 95% Confidence at Various Precision Levels for USPS Expected Coefficients of Variation (CVs) for ODIS-RPW Revenue and Volume Samples																
95% Confidence Level (or reliability target)																
	Coefficient of Variation (CV) from Table 1 in USPS RM2009-5				Minimum Sample Size Required for 90% Precision (or 10% tolerable error)				Minimum Sample Size Required for 95% Precision (or 5% tolerable error)				Minimum Sample Size Required for 98% Precision (or 2% tolerable error)			
	Revenue		Volume		Revenue		Volume		Revenue		Volume		Revenue		Volume	
	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction
First-Class Single-Piece Letters	0.26	0.31	0.35	0.43	26	37	47	71	104	148	188	284	649	923	1176	1776
First-Class Single-Piece Cards	1.46	1.50	1.47	1.51	819	864	830	876	3276	3457	3321	3504	20472	21609	20753	21898
First-Class Flats	1.16	1.16	1.44	1.44	517	517	797	797	2068	2068	3186	3186	12923	12923	19915	19915
First-Class Parcel	1.73	1.79	2.31	2.39	1150	1231	2050	2194	4599	4924	8200	8777	28744	30772	51248	54859
Package Services Single Piece Parcel Post	1.00	1.04	1.11	1.15	384	416	473	508	1537	1662	1893	2032	9604	10388	11833	12701
Package Services Bound Printed Matter Flats	0.18	0.19	0.07	0.08	12	14	2	2	50	55	8	10	311	347	47	61
Package Services Bound Printed Matter Parcels	0.15	0.16	0.08	0.08	9	10	2	2	35	39	10	10	216	246	61	61
Package Services Media and Library Mail	0.59	0.61	0.53	0.54	134	143	108	112	535	572	432	448	3343	3574	2698	2801
Priority Mail	0.41	0.43	0.93	0.97	65	71	332	361	258	284	1329	1446	1614	1776	8306	9036

Table 3: Minimum Sample Size Required for 99% Confidence at Various Precision Levels for USPS Expected Coefficients of Variation (CVs) for ODIS-RPW Revenue and Volume Samples																
	99% Confidence Level (or reliability target)															
	Coefficient of Variation (CV) from Table 1 in USPS RM2009-5				Minimum Sample Size Required for 90% Precision (or 10% tolerable error)				Minimum Sample Size Required for 95% Precision (or 5% tolerable error)				Minimum Sample Size Required for 98% Precision (or 2% tolerable error)			
	Revenue		Volume		Revenue		Volume		Revenue		Volume		Revenue		Volume	
	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction
First-Class Single-Piece Letters	0.26	0.31	0.35	0.43	45	64	81	123	179	255	325	491	1121	1594	2032	3067
First-Class Single-Piece Cards	1.46	1.50	1.47	1.51	1414	1493	1434	1513	5658	5972	5736	6052	35362	37326	35848	37826
First-Class Flats	1.16	1.16	1.44	1.44	893	893	1376	1376	3572	3572	5504	5504	22323	22323	34400	34400
First-Class Parcel	1.73	1.79	2.31	2.39	1986	2126	3541	3790	7944	8505	14164	15162	49651	53154	88523	94761
Package Services Single Piece Parcel Post	1.00	1.04	1.11	1.15	664	718	818	878	2654	2871	3270	3510	16589	17943	20440	21940
Package Services Bound Printed Matter Flats	0.18	0.19	0.07	0.08	21	24	3	4	86	96	13	17	537	599	81	106
Package Services Bound Printed Matter Parcels	0.15	0.16	0.08	0.08	15	17	4	4	60	68	17	17	373	425	106	106
Package Services Media and Library Mail	0.59	0.61	0.53	0.54	231	247	186	193	924	988	746	774	5775	6173	4660	4837
Priority Mail	0.41	0.43	0.93	0.97	112	123	574	624	446	491	2296	2497	2789	3067	14348	15609

Table 4: Minimum Sample Size Required for 90% Confidence at Various Precision Levels for USPS Expected Coefficients of Variation (CVs) for ODIS-RPW Cost per Piece and Cost Coverage Samples																
	90% Confidence Level (or reliability target)															
	Coefficient of Variation from Table 2 in USPS RM2009-5				Minimum Sample Size Required for 90% Precision (or 10% tolerable error)				Minimum Sample Size Required for 95% Precision (or 5% tolerable error)				Minimum Sample Size Required for 98% Precision (or 2% tolerable error)			
	Cost per Piece		Cost Coverage		Cost per Piece		Cost Coverage		Cost per Piece		Cost Coverage		Cost per Piece		Cost Coverage	
	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction
First-Class Single-Piece Letters	0.64	0.68	0.59	0.62	111	125	94	104	443	501	377	416	2771	3128	2355	2600
First-Class Single-Piece Cards	2.37	2.40	2.37	2.39	1520	1559	1520	1546	6080	6235	6080	6183	37999	38967	37999	38643
First-Class Flats	1.71	1.71	1.48	1.48	791	791	593	593	3165	3165	2371	2371	19782	19782	14818	14818
First-Class Parcel	2.70	2.77	2.23	2.27	1973	2076	1346	1394	7891	8305	5383	5578	49317	51908	33642	34860
Package Services Single Piece Parcel Post	2.20	2.22	2.14	2.16	1310	1334	1239	1263	5239	5335	4957	5050	32743	33341	30981	31563
Package Services Bound Printed Matter Flats	2.99	2.99	3.00	3.00	2419	2419	2435	2435	9677	9677	9742	9742	60480	60480	60886	60886
Package Services Bound Printed Matter Parcels	2.13	2.13	2.13	2.13	1228	1228	1228	1228	4911	4911	4911	4911	30692	30692	30692	30692
Package Services Media and Library Mail	2.17	2.17	2.18	2.19	1274	1274	1286	1298	5097	5097	5144	5191	31856	31856	32150	32446
Priority Mail	1.42	1.44	1.15	1.15	546	561	358	358	2183	2244	1431	1431	13641	14028	8947	8947

Table 5: Minimum Sample Size Required for 95% Confidence at Various Precision Levels for USPS Expected Coefficients of Variation (CVs) for ODIS-RPW Cost per Piece and Cost Coverage Samples																
95% Confidence Level (or reliability target)																
	Coefficient of Variation from Table 2 in USPS RM2009-5				Minimum Sample Size Required for 90% Precision (or 10% tolerable error)				Minimum Sample Size Required for 95% Precision (or 5% tolerable error)				Minimum Sample Size Required for 98% Precision (or 2% tolerable error)			
	Cost per Piece		Cost Coverage		Cost per Piece		Cost Coverage		Cost per Piece		Cost Coverage		Cost per Piece		Cost Coverage	
	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction
First-Class Single-Piece Letters	0.64	0.68	0.59	0.62	157	178	134	148	629	711	535	591	3934	4441	3343	3692
First-Class Single-Piece Cards	2.37	2.40	2.37	2.39	2158	2213	2158	2194	8631	8851	8631	8777	53945	55319	53945	54859
First-Class Flats	1.71	1.71	1.48	1.48	1123	1123	841	841	4493	4493	3366	3366	28083	28083	21037	21037
First-Class Parcel	2.70	2.77	2.23	2.27	2801	2948	1910	1980	11202	11790	7642	7918	70013	73691	47760	49488
Package Services Single Piece Parcel Post	2.20	2.22	2.14	2.16	1859	1893	1759	1792	7437	7573	7037	7169	46483	47332	43982	44808
Package Services Bound Printed Matter Flats	2.99	2.99	3.00	3.00	3434	3434	3457	3457	13738	13738	13830	13830	85861	85861	86436	86436
Package Services Bound Printed Matter Parcels	2.13	2.13	2.13	2.13	1743	1743	1743	1743	6972	6972	6972	6972	43572	43572	43572	43572
Package Services Media and Library Mail	2.17	2.17	2.18	2.19	1809	1809	1826	1842	7236	7236	7303	7370	45224	45224	45642	46062
Priority Mail	1.42	1.44	1.15	1.15	775	797	508	508	3098	3186	2032	2032	19366	19915	12701	12701

Table 6: Minimum Sample Size Required for 99% Confidence at Various Precision Levels for USPS Expected Coefficients of Variation (CVs) for ODIS-RPW Cost per Piece and Cost Coverage Samples																
99% Confidence Level (or reliability target)																
	Coefficient of Variation from Table 2 in USPS RM2009-5				Minimum Sample Size Required for 90% Precision (or 10% tolerable error)				Minimum Sample Size Required for 95% Precision (or 5% tolerable error)				Minimum Sample Size Required for 98% Precision (or 2% tolerable error)			
	Cost per Piece		Cost Coverage		Cost per Piece		Cost Coverage		Cost per Piece		Cost Coverage		Cost per Piece		Cost Coverage	
	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction
First-Class Single-Piece Letters	0.64	0.68	0.59	0.62	272	307	231	255	1087	1227	924	1020	6795	7671	5775	6377
First-Class Single-Piece Cards	2.37	2.40	2.37	2.39	3727	3822	3727	3790	14909	15289	14909	15162	93181	95555	93181	94761
First-Class Flats	1.71	1.71	1.48	1.48	1940	1940	1454	1454	7761	7761	5814	5814	48509	48509	36338	36338
First-Class Parcel	2.70	2.77	2.23	2.27	4837	5092	3300	3419	19350	20366	13200	13677	120937	127289	82498	85484
Package Services Single Piece Parcel Post	2.20	2.22	2.14	2.16	3212	3270	3039	3096	12847	13082	12156	12384	80293	81759	75973	77400
Package Services Bound Printed Matter Flats	2.99	2.99	3.00	3.00	5932	5932	5972	5972	23730	23730	23889	23889	148311	148311	149305	149305
Package Services Bound Printed Matter Parcels	2.13	2.13	2.13	2.13	3011	3011	3011	3011	12042	12042	12042	12042	75265	75265	75265	75265
Package Services Media and Library Mail	2.17	2.17	2.18	2.19	3125	3125	3154	3183	12499	12499	12614	12730	78118	78118	78840	79565
Priority Mail	1.42	1.44	1.15	1.15	1338	1376	878	878	5352	5504	3510	3510	33451	34400	21940	21940

Table 7: Sensitivity Test - Minimum Sample Size Required for 95% Confidence at Various Precision Levels for USPS Expected Coefficients of Variation (CVs) for ODIS-RPW Revenue and Volume Samples																
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)				
	95% Confidence Level (or reliability target)															
	Coefficient of Variation (CV) from Table 1 in USPS RM2009-5				Minimum Sample Size Required for 93% Precision (or 7% tolerable error)				Minimum Sample Size Required for 94% Precision (or 6% tolerable error)				Minimum Sample Size Required for 95% Precision (or 5% tolerable error)			
	Revenue		Volume		Revenue		Volume		Revenue		Volume		Revenue		Volume	
	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction
First-Class Single-Piece Letters	0.26	0.31	0.35	0.43	53	75	96	145	72	103	131	197	104	148	188	284
First-Class Single-Piece Cards	1.46	1.50	1.47	1.51	1671	1764	1694	1788	2275	2401	2306	2433	3276	3457	3321	3504
First-Class Flats	1.16	1.16	1.44	1.44	1055	1055	1626	1626	1436	1436	2213	2213	2068	2068	3186	3186
First-Class Parcel	1.73	1.79	2.31	2.39	2346	2512	4184	4478	3194	3419	5694	6095	4599	4924	8200	8777
Package Services Single Piece Parcel Post	1.00	1.04	1.11	1.15	784	848	966	1037	1067	1154	1315	1411	1537	1662	1893	2032
Package Services Bound Printed Matter Flats	0.18	0.19	0.07	0.08	25	28	4	5	35	39	5	7	50	55	8	10
Package Services Bound Printed Matter Parcels	0.15	0.16	0.08	0.08	18	20	5	5	24	27	7	7	35	39	10	10
Package Services Media and Library Mail	0.59	0.61	0.53	0.54	273	292	220	229	371	397	300	311	535	572	432	448
Priority Mail	0.41	0.43	0.93	0.97	132	145	678	738	179	197	923	1004	258	284	1329	1446

Table 8: Sensitivity Test - Minimum Sample Size Required for 95% Confidence at Various Precision Levels for USPS Expected Coefficients of Variation (CVs) for ODIS-RPW Cost per Piece and Cost Coverage Samples																
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)				
	95% Confidence Level (or reliability target)															
	Coefficient of Variation from Table 2 in USPS RM2009-5				Minimum Sample Size Required for 93% Precision (or 7% tolerable error)				Minimum Sample Size Required for 94% Precision (or 6% tolerable error)				Minimum Sample Size Required for 95% Precision (or 5% tolerable error)			
	Cost per Piece		Cost Coverage		Cost per Piece		Cost Coverage		Cost per Piece		Cost Coverage		Cost per Piece		Cost Coverage	
	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction
First-Class Single-Piece Letters	0.64	0.68	0.59	0.62	321	363	273	301	437	493	371	410	629	711	535	591
First-Class Single-Piece Cards	2.37	2.40	2.37	2.39	4404	4516	4404	4478	5994	6147	5994	6095	8631	8851	8631	8777
First-Class Flats	1.71	1.71	1.48	1.48	2292	2292	1717	1717	3120	3120	2337	2337	4493	4493	3366	3366
First-Class Parcel	2.70	2.77	2.23	2.27	5715	6016	3899	4040	7779	8188	5307	5499	11202	11790	7642	7918
Package Services Single Piece Parcel Post	2.20	2.22	2.14	2.16	3795	3864	3590	3658	5165	5259	4887	4979	7437	7573	7037	7169
Package Services Bound Printed Matter Flats	2.99	2.99	3.00	3.00	7009	7009	7056	7056	9540	9540	9604	9604	13738	13738	13830	13830
Package Services Bound Printed Matter Parcels	2.13	2.13	2.13	2.13	3557	3557	3557	3557	4841	4841	4841	4841	6972	6972	6972	6972
Package Services Media and Library Mail	2.17	2.17	2.18	2.19	3692	3692	3726	3760	5025	5025	5071	5118	7236	7236	7303	7370
Priority Mail	1.42	1.44	1.15	1.15	1581	1626	1037	1037	2152	2213	1411	1411	3098	3186	2032	2032

Table 9: Sensitivity Test - Minimum Sample Size Required for 95% Precision at Various Confidence Levels for USPS Expected Coefficients of Variation (CVs) for ODIS-RPW Revenue and Volume Samples																
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)				
	95% Precision (or 5% tolerable error)															
	Coefficient of Variation (CV) from Table 1 in USPS RM2009-5				Minimum Sample Size Required for 91% Confidence (or reliability target)				Minimum Sample Size Required for 94% Confidence (or reliability target)				Minimum Sample Size Required for 95% Confidence (or reliability target)			
	Revenue		Volume		Revenue		Volume		Revenue		Volume		Revenue		Volume	
	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction
First-Class Single-Piece Letters	0.26	0.31	0.35	0.43	79	112	143	216	97	138	176	266	104	148	188	284
First-Class Single-Piece Cards	1.46	1.50	1.47	1.51	2487	2626	2522	2661	3068	3239	3110	3282	3276	3457	3321	3504
First-Class Flats	1.16	1.16	1.44	1.44	1570	1570	2420	2420	1937	1937	2985	2985	2068	2068	3186	3186
First-Class Parcel	1.73	1.79	2.31	2.39	3492	3739	6227	6665	4308	4612	7681	8222	4599	4924	8200	8777
Package Services Single Piece Parcel Post	1.00	1.04	1.11	1.15	1167	1262	1438	1543	1439	1557	1774	1904	1537	1662	1893	2032
Package Services Bound Printed Matter Flats	0.18	0.19	0.07	0.08	38	42	6	7	47	52	7	9	50	55	8	10
Package Services Bound Printed Matter Parcels	0.15	0.16	0.08	0.08	26	30	7	7	32	37	9	9	35	39	10	10
Package Services Media and Library Mail	0.59	0.61	0.53	0.54	406	434	328	340	501	536	404	420	535	572	432	448
Priority Mail	0.41	0.43	0.93	0.97	196	216	1009	1098	242	266	1245	1354	258	284	1329	1446

Table 10: Sensitivity Test - Minimum Sample Size Required for 95% Precision at Various Confidence Levels for USPS Expected Coefficients of Variation (CVs) for ODIS-RPW Cost per Piece and Cost Coverage Samples																
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)				
	95% Precision (or 5% tolerable error)															
	Coefficient of Variation from Table 2 in USPS RM2009-5				Minimum Sample Size Required for 91% Confidence (or reliability target)				Minimum Sample Size Required for 94% Confidence (or reliability target)				Minimum Sample Size Required for 95% Confidence (or reliability target)			
	Cost per Piece		Cost Coverage		Cost per Piece		Cost Coverage		Cost per Piece		Cost Coverage		Cost per Piece		Cost Coverage	
	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction	Full Sample	20% Reduction
First-Class Single-Piece Letters	0.64	0.68	0.59	0.62	478	540	406	449	590	666	501	553	629	711	535	591
First-Class Single-Piece Cards	2.37	2.40	2.37	2.39	6554	6721	6554	6665	8085	8291	8085	8222	8631	8851	8631	8777
First-Class Flats	1.71	1.71	1.48	1.48	3412	3412	2556	2556	4209	4209	3153	3153	4493	4493	3366	3366
First-Class Parcel	2.70	2.77	2.23	2.27	8507	8954	5803	6013	10494	11045	7158	7417	11202	11790	7642	7918
Package Services Single Piece Parcel Post	2.20	2.22	2.14	2.16	5648	5751	5344	5444	6967	7094	6592	6716	7437	7573	7037	7169
Package Services Bound Printed Matter Flats	2.99	2.99	3.00	3.00	10432	10432	10502	10502	12869	12869	12955	12955	13738	13738	13830	13830
Package Services Bound Printed Matter Parcels	2.13	2.13	2.13	2.13	5294	5294	5294	5294	6531	6531	6531	6531	6972	6972	6972	6972
Package Services Media and Library Mail	2.17	2.17	2.18	2.19	5495	5495	5546	5597	6778	6778	6841	6904	7236	7236	7303	7370
Priority Mail	1.42	1.44	1.15	1.15	2353	2420	1543	1543	2902	2985	1904	1904	3098	3186	2032	2032