

## AIM Sample Sufficiency Tables

### Introduction:

AIM practitioners can use the margin of error (MOE) tables below to better understand the total sample sizes that are needed to obtain acceptable confidence intervals. These tables can only be used if there is enough available AIM data to estimate the proportions of the resource that are and are not meeting monitoring objectives. The statistical foundations on which these tables are based can only be applied to proportional estimates of resource condition, where point weights are used in the calculations. Therefore, these tables should not be applied to a plot-counting approach.

MOE is half of a confidence interval. Complimentary landscape percentages (e.g. 5/95, 10/90, 20/80) have the same MOE, so if the proportions of the resource that are meeting and are not meeting the objective are complementary, then simply multiply the MOE by two to derive the width of the entire confidence interval. In some scenarios, the proportions of the resource that are and are not meeting the objective may not be complementary (e.g. 70% meeting, 20% not meeting, 10% unknown) and thus the MOE will differ for the different proportional categories. Confidence intervals are bounded by 0 and 100%.

### Table Use Instructions

To use the tables, practitioners will first need to know the proportions of the landscape that are estimated to be meeting and not meeting the benchmark for a given indicator, and the number of sampled points (i.e. current sample size) that were used to calculate those estimates. Second, practitioners will need to know the level of confidence that they would like to have surrounding their final proportional estimates.

To obtain a MOE, select the table that corresponds to the desired confidence level. Next, find a sample size that corresponds to the number of points that were used to derive proportional estimates of resource condition. Follow this row to the right until you reach the column that most closely matches the percentages of the resource that were observed to be meeting and not meeting the specified benchmark. The value displayed in this cell is the estimated margin of error (MOE) for the proportion based on the current sample size.

### Example

An ID team wants to understand what sample size they need to have to be 80% confident that they are meeting one of their objectives with a reasonably narrow confidence interval (CI). The current sample size (N) for the reporting unit is 10 points. Data collected at these 10 points were used to estimate that 80% of the resource is meeting their objective and 20% is not. Using the Table 1, the ID team determined that the MOE for their data is 17.1% for both proportions of the landscape, meaning that the width of their CIs is 34.2%. Since this value is quite large, the ID team decided to try to reduce the width of the CIs to 15% or less. So they used the table to determine that they should attempt to sample 40 additional points to achieve a total sample size of 50, which will hopefully reduce the MOEs to 7.3%, and the width of the CIs to 14.6%.

Table 1. Margin of error (MOE) estimates for an 80% confidence level. The highlighted cell in this table corresponds to the example above.

Sample size (N)	Percentage of the resource either meeting/not meeting, or not meeting/meeting a benchmark									
	5/95	10/90	15/85	20/80	25/75	30/70	35/65	40/60	45/55	50/50
5	14.0	19.2	22.9	25.6	27.8	29.4	30.6	31.4	31.9	32.0
10	9.3	12.8	15.2	17.1	18.5	19.6	20.4	20.9	21.2	21.4
15	7.5	10.3	12.2	13.7	14.8	15.7	16.3	16.8	17.0	17.1
20	6.4	8.8	10.5	11.8	12.7	13.5	14.0	14.4	14.6	14.7
25	5.7	7.8	9.3	10.5	11.3	12.0	12.5	12.8	13.0	13.1
30	5.2	7.1	8.5	9.5	10.3	10.9	11.4	11.7	11.8	11.9
35	4.8	6.6	7.8	8.8	9.5	10.1	10.5	10.8	10.9	11.0
40	4.5	6.2	7.3	8.2	8.9	9.4	9.8	10.0	10.2	10.3
45	4.2	5.8	6.9	7.7	8.4	8.8	9.2	9.5	9.6	9.7
50	4.0	5.5	6.5	7.3	7.9	8.4	8.7	9.0	9.1	9.2
55	3.8	5.2	6.2	7.0	7.6	8.0	8.3	8.5	8.7	8.7
60	3.6	5.0	6.0	6.7	7.2	7.6	8.0	8.2	8.3	8.3
65	3.5	4.8	5.7	6.4	6.9	7.3	7.6	7.8	8.0	8.0
70	3.4	4.6	5.5	6.2	6.7	7.1	7.4	7.6	7.7	7.7
75	3.2	4.5	5.3	6.0	6.4	6.8	7.1	7.3	7.4	7.4
80	3.1	4.3	5.2	5.8	6.2	6.6	6.9	7.1	7.2	7.2

Table 2. Margin of error (MOE) of percentage estimates for an 85% confidence level.

Sample size (N)	Percentage of the resource either meeting/not meeting, or not meeting/meeting a benchmark									
	5/95	10/90	15/85	20/80	25/75	30/70	35/65	40/60	45/55	50/50
5	15.7	21.6	25.7	28.8	31.2	33.0	34.3	35.3	35.8	36.0
10	10.5	14.4	17.1	19.2	20.8	22.0	22.9	23.5	23.9	24.0
15	8.4	11.5	13.7	15.4	16.7	17.6	18.4	18.8	19.1	19.2
20	7.2	9.9	11.8	13.2	14.3	15.1	15.8	16.2	16.4	16.5
25	6.4	8.8	10.5	11.7	12.7	13.5	14.0	14.4	14.6	14.7
30	5.8	8.0	9.6	10.7	11.6	12.2	12.7	13.1	13.3	13.4
35	5.4	7.4	8.8	9.9	10.7	11.3	11.8	12.1	12.3	12.3
40	5.0	6.9	8.2	9.2	10.0	10.6	11.0	11.3	11.5	11.5
45	4.7	6.5	7.8	8.7	9.4	9.9	10.3	10.6	10.8	10.8
50	4.5	6.2	7.3	8.2	8.9	9.4	9.8	10.1	10.2	10.3
55	4.3	5.9	7.0	7.8	8.5	9.0	9.3	9.6	9.8	9.8
60	4.1	5.6	6.7	7.5	8.1	8.6	8.9	9.2	9.3	9.4
65	3.9	5.4	6.4	7.2	7.8	8.2	8.6	8.8	8.9	9.00
70	3.8	5.2	6.2	6.9	7.5	7.9	8.3	8.5	8.6	8.7
75	3.6	5.0	6.0	6.7	7.2	7.7	8.0	8.2	8.3	8.4
80	3.5	4.9	5.8	6.5	7.0	7.4	7.7	7.9	8.1	8.1

Table 3. Margin of error (MOE) of percentage estimates for a 90% confidence level.

Sample size (N)	Percentage of the resource either meeting/not meeting, or not meeting/meeting a benchmark									
	5/95	10/90	15/85	20/80	25/75	30/70	35/65	40/60	45/55	50/50
5	17.9	24.7	29.4	32.9	35.6	37.7	39.2	40.3	40.9	41.1
10	12.0	16.5	19.6	21.9	23.7	25.1	26.2	26.9	27.3	27.4
15	9.6	13.2	15.7	17.6	19.0	20.2	21.0	21.5	21.9	22.0
20	8.2	11.3	13.5	15.1	16.3	17.3	18.0	18.5	18.8	18.9
25	7.3	10.1	12.0	13.4	14.5	15.4	16.0	16.4	16.7	16.8
30	6.7	9.2	10.9	12.2	13.2	14.0	14.6	15.0	15.2	15.3
35	6.2	8.5	10.1	11.3	12.2	12.9	13.4	13.8	14.0	14.1
40	5.7	7.9	9.4	10.5	11.4	12.1	12.6	12.9	13.1	13.2
45	5.4	7.4	8.8	9.9	10.7	11.4	11.8	12.2	12.3	12.4
50	5.1	7.1	8.4	9.4	10.2	10.8	11.2	11.5	11.7	11.8
55	4.9	6.7	8.0	9.0	9.7	10.3	10.7	11.0	11.1	11.2
60	4.7	6.4	7.6	8.6	9.3	9.8	10.2	10.5	10.6	10.7
65	4.5	6.2	7.3	8.2	8.9	9.4	9.8	10.1	10.2	10.3
70	4.3	5.9	7.1	7.9	8.6	9.1	9.4	9.7	9.8	9.9
75	4.2	5.7	6.8	7.6	8.3	8.8	9.1	9.4	9.5	9.6
80	4.0	5.6	6.6	7.4	8.0	8.5	8.8	9.1	9.2	9.2

Table 4. Margin of error (MOE) of percentage estimates for a 95% confidence level.

Sample size (N)	Percentage of the resource either meeting/not meeting, or not meeting/meeting a benchmark									
	5/95	10/90	15/85	20/80	25/75	30/70	35/65	40/60	45/55	50/50
5	21.4	29.4	35.0	39.2	42.4	44.9	46.7	48.0	48.8	49.0
10	14.2	19.6	23.3	26.1	28.3	29.9	31.2	32.0	32.5	32.7
15	11.4	15.7	18.7	20.9	22.7	24.0	25.0	25.7	26.1	26.2
20	9.8	13.5	16.1	18.0	19.5	20.6	21.4	22.0	22.4	22.5
25	8.7	12.0	14.3	16.0	17.3	18.3	19.1	19.6	19.9	20.0
30	7.9	10.9	13.0	14.6	15.8	16.7	17.4	17.8	18.1	18.2
35	7.3	10.1	12.0	13.4	14.6	15.4	16.0	16.5	16.7	16.8
40	6.8	9.4	11.2	12.6	13.6	14.4	15.0	15.4	15.6	15.7
45	6.4	8.9	10.6	11.8	12.8	13.5	14.1	14.5	14.7	14.8
50	6.1	8.4	10.0	11.2	12.1	12.8	13.4	13.7	13.9	14.0
55	5.8	8.0	9.5	10.7	11.6	12.2	12.7	13.1	13.3	13.3
60	5.6	7.6	9.1	10.2	11.1	11.7	12.2	12.5	12.7	12.8
65	5.3	7.4	8.8	9.8	10.6	11.2	11.7	12.0	12.2	12.2
70	5.1	7.1	8.4	9.4	10.2	10.8	11.2	11.6	11.7	11.8
75	5.0	6.8	8.1	9.1	9.9	10.4	10.9	11.2	11.3	11.4
80	4.8	6.6	7.9	8.8	9.6	10.1	10.5	10.8	11.0	11.0