A comparison of design-based and model-based approaches for finite population spatial data – Supporting Information.

Michael Dumelle*[,a], Matt Higham[b], Lisa Madsen[c], Anthony R. Olsen[a], Jay M. Ver Hoef[d]

[a] *United States Environmental Protection Agency, 200 SW 35th St, Corvallis, Oregon, 97333*
[b] *Saint Lawrence University Department of Mathematics, Computer Science, and Statistics, 23 Romoda Drive, Canton, New York, 13617*
[c] *Oregon State University Department of Statistics, 239 Weniger Hall, Corvallis, Oregon, 97331*
[d] *Marine Mammal Laboratory, Alaska Fisheries Science Center, National Oceanic and Atmospheric Administration, Seattle, Washington, 98115*

1. Simulation Study Tables

Recall the four sampling-analysis combinations from the simulation study, summarized in Table 1. Also recall the 36 parameter configurations from the simulation study, summarized in Table 2.

	Design	Model
IRS	IRS-Design	IRS-Model
GRTS	GRTS-Design	GRTS-Model

Table 1: Sampling-analysis combinations in the simulation study. The rows give the two types of sampling designs and the columns give the two types of analyses.

Sample Size (n)	50	100	200
Layout	Random	Gridded	-
Proportion of Dependent Error	0	0.5	0.9
Response Type	Normal	Lognormal	-

Table 2: Simulation scenario options. All combinations of sample size, location layout, response type, and proportion of dependent random error composed the 36 simulation scenarios. In each simualtion scenario, the total variance was 2.

Next we present tables summarizing mean estimation bias (design-based) or mean prediction bias (model-based), root-mean-squared error (design-based) or root-mean-squared-prediction error (model-based), and 95% confidence interval coverage (design-based) or 95% prediction interval coverage (model-based) for all 36 simulation scenarios.

*Corresponding Author: Michael Dumelle (Dumelle.Michael@epa.gov)

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Gridded	Normal	0	50	-0.0023	0.1968	0.9440
IRS-Model	Gridded	Normal	0	50	-0.0029	0.1988	0.9400
GRTS-Design	Gridded	Normal	0	50	-0.0011	0.1946	0.9110
GRTS-Model	Gridded	Normal	0	50	-0.0006	0.1949	0.9300

Table 3: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 1.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Gridded	Lognormal	0	50	-0.0036	0.2007	0.9080
IRS-Model	Gridded	Lognormal	0	50	-0.0094	0.2071	0.9045
GRTS-Design	Gridded	Lognormal	0	50	-0.0007	0.1962	0.8690
GRTS-Model	Gridded	Lognormal	0	50	-0.0022	0.1969	0.8945

Table 4: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 2.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Random	Normal	0	50	0.0019	0.1861	0.9505
IRS-Model	Random	Normal	0	50	0.0014	0.1892	0.9445
GRTS-Design	Random	Normal	0	50	-0.0040	0.1955	0.9090
GRTS-Model	Random	Normal	0	50	-0.0040	0.1965	0.9315

Table 5: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 3.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Random	Lognormal	0	50	0.0032	0.1843	0.9205
IRS-Model	Random	Lognormal	0	50	-0.0039	0.1945	0.9105
GRTS-Design	Random	Lognormal	0	50	-0.0056	0.1944	0.8870
GRTS-Model	Random	Lognormal	0	50	-0.0078	0.1967	0.9075

Table 6: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 4.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Gridded	Normal	0.5	50	0.0025	0.1762	0.9470
IRS-Model	Gridded	Normal	0.5	50	0.0007	0.1655	0.9305
GRTS-Design	Gridded	Normal	0.5	50	0.0004	0.1524	0.9115
GRTS-Model	Gridded	Normal	0.5	50	-0.0003	0.1499	0.9320

Table 7: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 5.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Gridded	Lognormal	0.5	50	0.0004	0.1863	0.9140
IRS-Model	Gridded	Lognormal	0.5	50	-0.0076	0.1834	0.9035
GRTS-Design	Gridded	Lognormal	0.5	50	0.0016	0.1612	0.8810
GRTS-Model	Gridded	Lognormal	0.5	50	-0.0017	0.1606	0.8940

Table 8: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 6.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Random	Normal	0.5	50	0.0037	0.1657	0.9590
IRS-Model	Random	Normal	0.5	50	0.0027	0.1546	0.9495
GRTS-Design	Random	Normal	0.5	50	-0.0034	0.1511	0.9170
GRTS-Model	Random	Normal	0.5	50	-0.0037	0.1504	0.9305

Table 9: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 7.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Random	Lognormal	0.5	50	0.0023	0.1637	0.9245
IRS-Model	Random	Lognormal	0.5	50	-0.0055	0.1622	0.9125
GRTS-Design	Random	Lognormal	0.5	50	-0.0057	0.1570	0.9000
GRTS-Model	Random	Lognormal	0.5	50	-0.0079	0.1567	0.9100

Table 10: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 8.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Gridded	Normal	0.9	50	0.0053	0.1579	0.9470
IRS-Model	Gridded	Normal	0.9	50	0.0026	0.1165	0.9315
GRTS-Design	Gridded	Normal	0.9	50	0.0013	0.1074	0.9220
GRTS-Model	Gridded	Normal	0.9	50	-0.0007	0.0949	0.9430

Table 11: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 9.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Gridded	Lognormal	0.9	50	0.0031	0.1731	0.9220
IRS-Model	Gridded	Lognormal	0.9	50	-0.0020	0.1325	0.9135
GRTS-Design	Gridded	Lognormal	0.9	50	0.0031	0.1183	0.9065
GRTS-Model	Gridded	Lognormal	0.9	50	-0.0002	0.1090	0.9120

Table 12: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 10.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Random	Normal	0.9	50	0.0062	0.1520	0.9525
IRS-Model	Random	Normal	0.9	50	0.0037	0.1074	0.9525
GRTS-Design	Random	Normal	0.9	50	-0.0029	0.1038	0.9340
GRTS-Model	Random	Normal	0.9	50	-0.0027	0.0940	0.9360

Table 13: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 11.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Random	Lognormal	0.9	50	0.0053	0.1542	0.9325
IRS-Model	Random	Lognormal	0.9	50	-0.0012	0.1160	0.9115
GRTS-Design	Random	Lognormal	0.9	50	-0.0033	0.1150	0.9160
GRTS-Model	Random	Lognormal	0.9	50	-0.0031	0.1014	0.9235

Table 14: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 12.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Gridded	Normal	0	100	-0.0029	0.1322	0.9430
IRS-Model	Gridded	Normal	0	100	-0.0033	0.1332	0.9410
GRTS-Design	Gridded	Normal	0	100	0.0041	0.1302	0.9245
GRTS-Model	Gridded	Normal	0	100	0.0038	0.1304	0.9420

Table 15: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 13.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Gridded	Lognormal	0	100	-0.0052	0.1334	0.9335
IRS-Model	Gridded	Lognormal	0	100	-0.0072	0.1350	0.9300
GRTS-Design	Gridded	Lognormal	0	100	0.0042	0.1303	0.9035
GRTS-Model	Gridded	Lognormal	0	100	0.0034	0.1307	0.9265

Table 16: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 14.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Random	Normal	0	100	-0.0066	0.1366	0.9405
IRS-Model	Random	Normal	0	100	-0.0067	0.1370	0.9385
GRTS-Design	Random	Normal	0	100	0.0028	0.1364	0.9180
GRTS-Model	Random	Normal	0	100	0.0029	0.1363	0.9345

Table 17: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 15.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Random	Lognormal	0	100	-0.0051	0.1348	0.9280
IRS-Model	Random	Lognormal	0	100	-0.0075	0.1372	0.9230
GRTS-Design	Random	Lognormal	0	100	0.0002	0.1375	0.8840
GRTS-Model	Random	Lognormal	0	100	-0.0003	0.1377	0.9090

Table 18: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 16.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Gridded	Normal	0.5	100	-0.0016	0.1177	0.9540
IRS-Model	Gridded	Normal	0.5	100	-0.0023	0.1072	0.9470
GRTS-Design	Gridded	Normal	0.5	100	0.0051	0.0998	0.9300
GRTS-Model	Gridded	Normal	0.5	100	0.0039	0.0982	0.9470

Table 19: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 17.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Gridded	Lognormal	0.5	100	-0.0021	0.1211	0.9445
IRS-Model	Gridded	Lognormal	0.5	100	-0.0058	0.1153	0.9295
GRTS-Design	Gridded	Lognormal	0.5	100	0.0041	0.1090	0.9085
GRTS-Model	Gridded	Lognormal	0.5	100	0.0019	0.1090	0.9180

Table 20: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 18.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Random	Normal	0.5	100	-0.0064	0.1222	0.9440
IRS-Model	Random	Normal	0.5	100	-0.0049	0.1073	0.9440
GRTS-Design	Random	Normal	0.5	100	0.0013	0.1041	0.9155
GRTS-Model	Random	Normal	0.5	100	0.0014	0.1020	0.9400

Table 21: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 19.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Random	Lognormal	0.5	100	-0.0063	0.1204	0.9355
IRS-Model	Random	Lognormal	0.5	100	-0.0097	0.1150	0.9275
GRTS-Design	Random	Lognormal	0.5	100	0.0003	0.1092	0.8960
GRTS-Model	Random	Lognormal	0.5	100	-0.0004	0.1088	0.9120

Table 22: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 20.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Gridded	Normal	0.9	100	-0.0007	0.1059	0.9605
IRS-Model	Gridded	Normal	0.9	100	-0.0019	0.0700	0.9445
GRTS-Design	Gridded	Normal	0.9	100	0.0044	0.0655	0.9435
GRTS-Model	Gridded	Normal	0.9	100	0.0030	0.0585	0.9440

Table 23: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 21.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Gridded	Lognormal	0.9	100	-0.0011	0.1092	0.9540
IRS-Model	Gridded	Lognormal	0.9	100	-0.0033	0.0779	0.9330
GRTS-Design	Gridded	Lognormal	0.9	100	0.0035	0.0757	0.9190
GRTS-Model	Gridded	Lognormal	0.9	100	0.0017	0.0693	0.9190

Table 24: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 22.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Random	Normal	0.9	100	-0.0048	0.1095	0.9430
IRS-Model	Random	Normal	0.9	100	-0.0017	0.0671	0.9535
GRTS-Design	Random	Normal	0.9	100	-0.0009	0.0674	0.9265
GRTS-Model	Random	Normal	0.9	100	0.0000	0.0595	0.9420

Table 25: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 23.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Random	Lognormal	0.9	100	-0.0045	0.1110	0.9375
IRS-Model	Random	Lognormal	0.9	100	-0.0052	0.0771	0.9310
GRTS-Design	Random	Lognormal	0.9	100	-0.0009	0.0732	0.9195
GRTS-Model	Random	Lognormal	0.9	100	-0.0007	0.0661	0.9165

Table 26: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 24.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Gridded	Normal	0	200	0.0013	0.0882	0.9550
IRS-Model	Gridded	Normal	0	200	0.0013	0.0886	0.9530
GRTS-Design	Gridded	Normal	0	200	-0.0045	0.0885	0.9380
GRTS-Model	Gridded	Normal	0	200	-0.0045	0.0885	0.9460

Table 27: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 25.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Gridded	Lognormal	0	200	0.0001	0.0880	0.9350
IRS-Model	Gridded	Lognormal	0	200	-0.0002	0.0883	0.9355
GRTS-Design	Gridded	Lognormal	0	200	-0.0034	0.0898	0.9285
GRTS-Model	Gridded	Lognormal	0	200	-0.0035	0.0900	0.9335

Table 28: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 26.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Random	Normal	0	200	-0.0014	0.0893	0.9465
IRS-Model	Random	Normal	0	200	-0.0015	0.0896	0.9465
GRTS-Design	Random	Normal	0	200	0.0007	0.0868	0.9460
GRTS-Model	Random	Normal	0	200	0.0007	0.0867	0.9490

Table 29: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 27.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Random	Lognormal	0	200	-0.0028	0.0891	0.9425
IRS-Model	Random	Lognormal	0	200	-0.0033	0.0896	0.9395
GRTS-Design	Random	Lognormal	0	200	0.0015	0.0860	0.9365
GRTS-Model	Random	Lognormal	0	200	0.0012	0.0861	0.9415

Table 30: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 28.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Gridded	Normal	0.5	200	0.0022	0.0788	0.9535
IRS-Model	Gridded	Normal	0.5	200	0.0008	0.0678	0.9580
GRTS-Design	Gridded	Normal	0.5	200	-0.0024	0.0671	0.9335
GRTS-Model	Gridded	Normal	0.5	200	-0.0030	0.0661	0.9410

Table 31: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 29.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Gridded	Lognormal	0.5	200	0.0016	0.0816	0.9420
IRS-Model	Gridded	Lognormal	0.5	200	-0.0000	0.0739	0.9335
GRTS-Design	Gridded	Lognormal	0.5	200	-0.0033	0.0744	0.9330
GRTS-Model	Gridded	Lognormal	0.5	200	-0.0041	0.0742	0.9350

Table 32: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 30.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Random	Normal	0.5	200	-0.0016	0.0790	0.9480
IRS-Model	Random	Normal	0.5	200	-0.0010	0.0690	0.9475
GRTS-Design	Random	Normal	0.5	200	-0.0002	0.0652	0.9455
GRTS-Model	Random	Normal	0.5	200	0.0001	0.0640	0.9500

Table 33: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 31.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Random	Lognormal	0.5	200	-0.0027	0.0809	0.9494
IRS-Model	Random	Lognormal	0.5	200	-0.0037	0.0732	0.9454
GRTS-Design	Random	Lognormal	0.5	200	-0.0008	0.0671	0.9434
GRTS-Model	Random	Lognormal	0.5	200	-0.0012	0.0662	0.9479

Table 34: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 32.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Gridded	Normal	0.9	200	0.0021	0.0704	0.9570
IRS-Model	Gridded	Normal	0.9	200	0.0005	0.0411	0.9590
GRTS-Design	Gridded	Normal	0.9	200	-0.0005	0.0423	0.9370
GRTS-Model	Gridded	Normal	0.9	200	-0.0012	0.0377	0.9450

Table 35: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 33.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Gridded	Lognormal	0.9	200	0.0014	0.0744	0.9520
IRS-Model	Gridded	Lognormal	0.9	200	-0.0002	0.0480	0.9355
GRTS-Design	Gridded	Lognormal	0.9	200	-0.0014	0.0499	0.9380
GRTS-Model	Gridded	Lognormal	0.9	200	-0.0022	0.0459	0.9380

Table 36: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 34.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Random	Normal	0.9	200	-0.0009	0.0725	0.9470
IRS-Model	Random	Normal	0.9	200	-0.0010	0.0409	0.9450
GRTS-Design	Random	Normal	0.9	200	-0.0005	0.0405	0.9490
GRTS-Model	Random	Normal	0.9	200	0.0001	0.0354	0.9510

Table 37: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 35.

Approach	Layout	Response	DE Prop	n	Bias	rMS(P)E	Coverage
IRS-Design	Random	Lognormal	0.9	200	-0.0006	0.0750	0.9393
IRS-Model	Random	Lognormal	0.9	200	-0.0025	0.0461	0.9418
GRTS-Design	Random	Lognormal	0.9	200	-0.0013	0.0452	0.9348
GRTS-Model	Random	Lognormal	0.9	200	-0.0012	0.0397	0.9418

Table 38: Sampling-analysis combination (Approach), population layout (Layout), response type (Response), proportion of dependent random error (DE Prop), sample size (n), mean (prediction) bias (Bias), root-mean-squared-(prediction) error (rMS(P)E), and 95% interval coverage (Coverage) in simulation scenario 36.