

Supplementary Information

Supplementary Table S1

Optimal parameters and maximum utility for different q values.

q	Optimal L (bp)	Optimal N (M reads)	Max utility U
0	1800	20	14.86
1	1800	20	9.82
2	1800	20	9.82

Supplementary Table S3

Feasible parameter combinations for $M = 192, B = 5000$ USD.

N (M reads)	L (bp)	U	Total data (Gb)	n_cells	Total cost (USD)
1	100	2.534	19.2	1	1850
2	100	4.040	38.4	1	1850
3	100	4.407	57.6	1	1850
4	100	4.621	76.8	2	3700
5	100	4.732	96.0	2	3700
6	100	4.819	115.2	2	3700
7	100	4.877	134.4	2	3700
1	200	2.682	38.4	1	2245
2	200	4.472	76.8	1	2245
3	200	4.790	115.2	1	2245
4	200	4.915	153.6	2	4490
5	200	4.997	192.0	2	4490
6	200	5.071	230.4	2	4490
7	200	5.139	268.8	2	4490
1	300	2.735	57.6	1	2620
2	300	4.653	115.2	1	2620
3	300	4.947	172.8	1	2620
1	400	2.760	76.8	1	3065
2	400	4.755	153.6	1	3065
3	400	5.057	230.4	1	3065
1	500	2.776	96.0	1	3510
2	500	4.828	192.0	1	3510
3	500	5.156	288.0	1	3510
1	600	2.788	115.2	1	3910
2	600	4.890	230.4	1	3910
3	600	5.251	345.6	1	3910

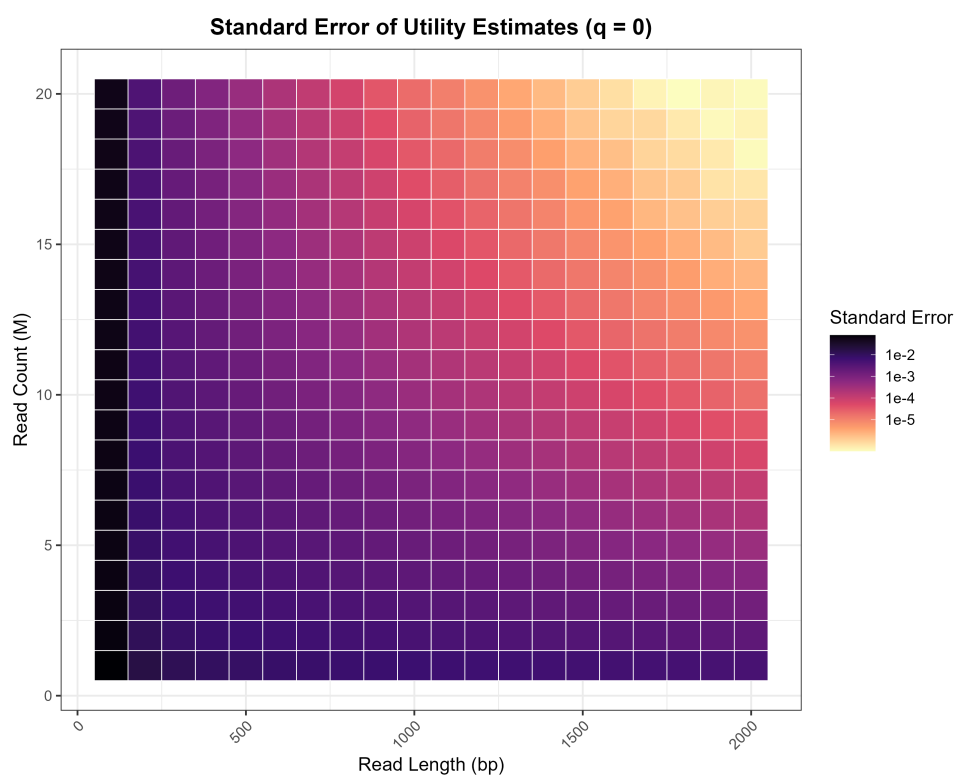
Supplementary Table S4

Sensitivity of optimal parameters to the number of multiplexed samples.

M (samples)	Optimal L (bp)	Optimal N (M reads)	Utility U	Per-sample cost (USD)
48	600	15	7.553	81.46
96	600	7	6.037	40.73
192	600	3	5.251	20.36

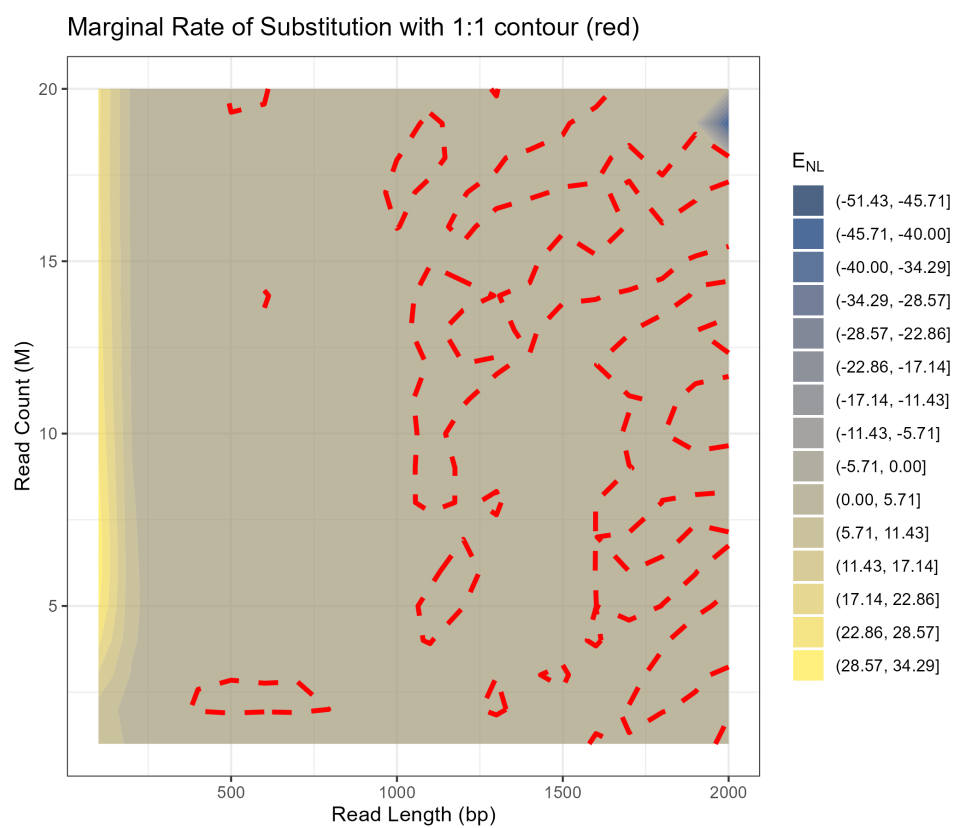
Supplementary Figure S1

Standard error of utility estimates (uncertainty heatmap).



Supplementary Figure S2

Contour plot of $E_{N,L}$ with the $E_{N,L} = 1$ isocline highlighted.



Supplementary Data

The CSV file `Extended_ENL_near_one.csv` lists all parameter combinations where $|E_{N,L} - 1| < 0.2$. This file is provided as a separate downloadable data file. A preview of the data structure is shown below:

N (M reads)	L (bp)	$E_{\{N,L\}}$	$ E_{\{N,L\}} - 1 $
4	200	0.933	0.067
4	300	1.049	0.049
4	400	1.055	0.055
4	500	1.058	0.058
4	600	1.056	0.056
...	...	...	...
20	1100	1.199	0.199
20	1200	0.897	0.103

The full dataset is available in the supplementary CSV file.