Table S1. Environmental Covariates (Daily Temperature and Precipitation) Associated with the Collection Dates of *Salmonella* Environmental Isolates (2019–2022).

Isolate ID	Collection Date	TMAX (°C)	TMIN (°C)	PRECIP (inches)
1	8/3/2021	25.0	14.40	0.00
2	8/3/2021	25.0	14.40	0.00
3	8/3/2021	25.0	14.40	0.00
4	8/25/2021	32.8	18.90	0.00
5	9/7/2021	25.6	17.80	0.00
6	9/7/2021	25.6	17.80	0.00
7	9/14/2021	28.3	17.20	0.00
8	9/21/2021	24.4	16.70	0.19
9	6/29/2021	32.2	20.60	0.00
14	4/20/2021	22.2	5.00	0.00
15	5/11/2021	15.6	5.00	0.00
16	5/18/2021	25.0	8.30	0.00
17	6/29/2021	32.2	20.60	0.00
19	7/3/2019	32.8	16.10	0.42
20	7/10/2019	31.1	17.20	0.00
21	10/8/2019	17.2	10.60	0.17

Environmental data were retrieved from the NOAA NCEI database for the sampling area. TMAX: maximum daily air temperature (°C); TMIN: minimum daily air temperature (°C); PRECIP: precipitation (inches).

Table S2. Metadata, Assembly Statistics, and NCBI Accession Numbers for the 16 *Salmonella* Isolates Recovered from Conococheague Creek Sediments (BioProject PRJNA1403484).

Isolate ID	SRA Accession	GenBank Accession	Serotype	Sequence Type (ST)	Collection Date	Location	Total Length (Mb)	N50 (bp)	GC (%)
1	SRR36868707	JBTVXP010000000	Newport	164	8/3/2021	TP	4.7	233010.00	52
2	SRR36868708	JBTVXQ010000000	Newport	164	8/3/2021	TP	4.7	224508.00	52
3	SRR36868709	JBTVXR010000000	Newport	164	8/3/2021	TP	4.7	227170.00	52
4	SRR36868710	JBTVXS010000000	Holcomb	2507	8/25/2021	SS	4.93	178702.00	52
5	SRR36868711	JBTVXT010000000	Typhimurium	19	9/7/2021	I81	4.85	270285.00	52
6	SRR36868712	JBTVXU010000000	Newport	118	9/7/2021	I81	4.7	302497.00	52
7	SRR36868713	JBTVXV010000000	Newport	118	9/14/2021	I81	4.7	267320.00	52
8	SRR36868714	JBTVXW010000000	Newport	118	9/21/2021	I81	4.7	267320.00	52
9	SRR36868715	JBTVXX010000000	Hartford	405	6/29/2021	TP	4.77	219121.00	52
14	SRR36868716	JBTVXY010000000	Give	654	4/20/2021	I81	4.88	257138.00	52
15	SRR36868717	JBTVXZ010000000	Newport	118	5/11/2021	I81	4.7	267320.00	52
16	SRR36868718	JBTVYA010000000	Braenderup	22	5/18/2021	I81	4.68	287779.00	52
17	SRR36868719	JBTVYB010000000	Braenderup	22	6/29/2021	I81	4.7	283463.00	52
19	SRR36868720	JBTVYC010000000	Give	654	7/3/2019	TP	4.86	225718.00	52
20	SRR36868721	JBTVYD010000000	Anatum	64	7/10/2019	TP	4.71	405062.00	52
21	SRR36868722	JBTVYE010000000	I 4,[5],12:i:-	19	10/8/2019	SS	4.87	223614.00	52

Table S3. Bioinformatics Software, Versions, and Parameters Used for Genome Analysis.

Analysis Step	Software/Tool	Version	Reference	Key Parameters / Flags
Read Trimming	BBDuk	v39.01	Bushnell B. 2025	qtrim=rl, trimq=22
Genome Assembly	SPAdes	v3.15.5	Bankevich et al. (2012)	--careful
Assembly Statistics	assembly-stats	v1.0.1	Challis (2017)	Default parameters
Genome Quality	CheckM	v1.0.13	Parks et al. (2015)	lineage_wf
Taxonomy (ANI)	GTDB-Tk	v2.1.0	Chaumeil et al. (2019)	GTDB database R207 (v2); FastANI against LT2 (ASM694v2)
Serotyping	SeqSero2S	v1.3.1	Zhang et al. (2019)	k-mer mode
Serotyping	SeqSero	v1.2	Zhang et al. (2015)	Default settings (Center for Genomic Epidemiology Server)
Serotyping	SSP	2023 Web-GUI	Sundaresan & Rathinavelan (2023)	Default BLASTp thresholds; https://project.iith.ac.in/SSP/
MLST	MLST	v2.0	Larsen et al. (2012)	Default settings (Center for Genomic Epidemiology Server)
Phylogeny	NDtree	v1.2	Leekitcharoenphon et al. (2014)	Fast mode; Reference: *S. enterica* str. 08-1736 (NC_021820); UPGMA algorithm
AMR Identification	ResFinder	v4.1	Bortolaia et al. (2020)	Threshold: 90%, Min. Length: 60%
Plasmid Detection	PlasmidFinder	v2.1	Carattoli et al. (2014)	Min. ID: 95%, Min. Coverage: 60%

SPI Detection	BLASTN / samtools	v1.17 (samtools)	Hsu et al. (2019)	80% identity threshold (broad); >70% cumulative query coverage
RM Systems	Restriction-ModificationFinder	v1.1	Roer et al. (2016)	Min. ID: 95%; Min. Length: 60%
CRISPR Analysis	CRISPRCasFinder	v4.2.2	Couvin et al. (2018)	Default parameters; Evidence level ≥3; https://crisprcas.i2bc.paris-saclay.fr/

Table S4. The CRISPR/Cas Loci of 16 *Salmonella* Isolates Detected Using CRISPRCasFinder Program.

Isolate ID	Element	CRISPR Id or Cas type	Start	End	No. Spacer or Gene	Repeat consensus or Cas genes	Evidence level
1	CRISPR	NODE_3_length_375768_cov_44_569838_1	73042	73142	1	GCTTCAGTGGCGAACGTCGTGAA	1
	CRISPR	NODE_18_length_89937_cov_42_949355_1	27478	28117	10	CGGTTTATCCCCGCTGGCGCGGGGAACACA	4
	Cas cluster	CAS	28213	36663	8	cas2_TypeIE, cas3_TypeI, cas3_TypeI, cas5_TypeIE, cas6_TypeIE, cas7_TypeIE, cse1_TypeIE, cse2_TypeIE	n/a
	CRISPR	NODE_18_length_89937_cov_42_949355_2	44363	45063	11	CGGTTTATCCCCGCTGGCGCGGGGAACACA	4
2	CRISPR	NODE_19_length_89937_cov_39_280425_1	44876	45575	11	GTGTTCCCCGCGCCAGCGGGGATAAACCG	4
	Cas cluster	CAS	53275	61725	8	cas2_TypeIE, cas3_TypeI, cas3_TypeI, cas5_TypeIE, cas6_TypeIE, cas7_TypeIE, cse1_TypeIE, cse2_TypeIE	n/a
	Cas cluster	CAS-TypeIE	55950	61725	7	cas1_TypeIE, cas2_TypeIE, cas5_TypeIE, cas6_TypeIE, cas7_TypeIE, cse1_TypeIE, cse2_TypeIE	n/a
	CRISPR	NODE_19_length_89937_cov_39_280425_2	61822	62460	10	GTGTTCCCCGCGCCAGCGGGGATAAACCG	4

3	CRISPR	NODE_2_length_375768_cov_41_627478_1	73042	73142	1	GCTTCAGTGGCGAACGTCGTGAA	1
	CRISPR	NODE_17_length_89937_cov_39_883919_1	27478	28117	10	CGGTTTATCCCCGCTGGCGCGGGGAACACA	4
	Cas cluster	CAS	28213	36663	8	cas2_TypeIE, cas3_TypeI, cas3_TypeI, cas5_TypeIE, cas6_TypeIE, cas7_TypeIE, cse1_TypeIE, cse2_TypeIE	n/a
	CRISPR	NODE_17_length_89937_cov_39_883919_2	44363	45063	11	CGGTTTATCCCCGCTGGCGCGGGGAACACA	4
4	CRISPR	NODE_5_length_297013_cov_39_241537_1	11235	11874	10	CGGTTTATCCCCGCTGGCGCGGGGAACAC	4
	Cas cluster	CAS-TypeIE	11971	20430	8	cas2_TypeIE, cas1_TypeIE, cas6_TypeIE, cas5_TypeIE, cas7_TypeIE, cse2_TypeIE, cse1_TypeIE, cas3_TypeI	n/a
	CRISPR	NODE_5_length_297013_cov_39_241537_2	28031	28546	8	CGGTTTATCCCCGCTGGCGCGGGGAACA	4
	CRISPR	NODE_10_length_158650_cov_43_816028_1	35859	35953	1	ACCGGGTCTACTGGCTCAGGGTCTAC	1
	Cas cluster	CAS	13715	15604	2	cas3_TypeI, cas3_TypeI	n/a
	CRISPR	NODE_37_length_35190_cov_41_313360_1	15444	15544	1	GCTTCAGTGGCGAACGTCGTGAA	1
5	CRISPR	NODE_4_length_324700_cov_26_489337_1	73042	73142	1	GCTTCAGTGGCGAACGTCGTGAA	1
	CRISPR	NODE_6_length_282549_cov_25_179370_1	98025	99152	18	GTGTTCCCCGCGCCAGCGGGGATAAACCG	4

	CRISPR	NODE_6_length_282549_cov_25_179370_2	99345	100289	15	GTGTTCCCCGCGCCAGCGGGGATAAACCG	4
	Cas cluster	CAS-TypeIE	107865	116324	8	cas3_TypeI, cse1_TypeIE, cse2_TypeIE, cas7_TypeIE, cas5_TypeIE, cas6_TypeIE, cas1_TypeIE, cas2_TypeIE	n/a
	CRISPR	NODE_6_length_282549_cov_25_179370_3	116421	117367	15	GTGTTCCCCGCGCCAGCGGGGATAAACCG	4
	CRISPR	NODE_6_length_282549_cov_25_179370_4	117441	117835	6	GTGTTCCCCGCGCCAGCGGGGATAAACCG	4
	CRISPR	NODE_23_length_59577_cov_24_933277_1	33955	34064	1	TTAAAAAAAGGTGGTACAGGGTGGGACA	1
6	CRISPR	NODE_2_length_466830_cov_42_799198_1	72651	72751	1	GCTTCAGTGGCGAACGTCGTGAA	1
	CRISPR	NODE_2_length_466830_cov_42_799198_2	420365	421430	17	GTGTTCCCCGCGCCAGCGGGGATAAACCG	4
	Cas cluster	CAS-TypeIE	429130	437580	8	cas3_TypeI, cse1_TypeIE, cse2_TypeIE, cas7_TypeIE, cas5_TypeIE, cas6_TypeIE, cas1_TypeIE, cas2_TypeIE	n/a
	CRISPR	NODE_2_length_466830_cov_42_799198_3	437677	438498	13	GTGTTCCCCGCGCCAGCGGGGATAAACCG	4
7	CRISPR	NODE_17_length_90484_cov_37_228091_1	27477	28298	13	CGGTTTATCCCCGCTGGCGCGGGGAACAC	4
	Cas cluster	CAS	28395	36845	8	cas2_TypeIE, cas3_TypeI, cas3_TypeI, cas5_TypeIE, cas6_TypeIE, cas7_TypeIE, cse1_TypeIE, cse2_TypeIE	n/a

	CRISPR	NODE_17_length_90484_cov_37_228091_2	44545	45610	17	CGGTTTATCCCCGCTGGCGCGGGGAACAC	4
8	CRISPR	NODE_1_length_466724_cov_36_347050_1	28333	29154	13	CGGTTTATCCCCGCTGGCGCGGGGAACAC	4
	Cas cluster	CAS-TypeIE	29251	37701	8	cas2_TypeIE, cas1_TypeIE, cas6_TypeIE, cas5_TypeIE, cas7_TypeIE, cse2_TypeIE, cse1_TypeIE, cas3_TypeI	n/a
	CRISPR	NODE_1_length_466724_cov_36_347050_2	45401	46466	17	CGGTTTATCCCCGCTGGCGCGGGGAACAC	4
9	CRISPR	NODE_24_length_46048_cov_38_807226_1	169	1173	16	CGGTTTATCCCCGCTGGCGCGGGGAACAC	4
	Cas cluster	CAS	7688	16147	8	cas2_TypeIE, cas3_TypeI, cas3_TypeI, cas5_TypeIE, cas6_TypeIE, cas7_TypeIE, cse1_TypeIE, cse2_TypeIE	n/a
	Cas cluster	CAS-TypeIE	10363	16147	7	cas1_TypeIE, cas2_TypeIE, cas5_TypeIE, cas6_TypeIE, cas7_TypeIE, cse1_TypeIE, cse2_TypeIE	n/a
	CRISPR	NODE_25_length_44979_cov_38_869338_1	16244	17493	20	GTGTTCCCCGCGCTAGCGGGGATAAACCG	4
14	CRISPR	NODE_2_length_442608_cov_33_507522_1	160248	161008	12	CGGTTTATCCCCGCTGGCGCGGGGAACAC	4
	Cas cluster	CAS-TypeIE	161093	170241	8	cas2_TypeIE, cas1_TypeIE, cas6_TypeIE, cas5_TypeIE, cas7_TypeIE, cse2_TypeIE, cse1_TypeIE, cas3_TypeI	n/a

	CRISPR	NODE_2_length_442608_cov_33_507522_2	177768	178894	18	CGGTTTATCCCCGCTGGCGCGGGGAACAC	4
15	CRISPR	NODE_4_length_375747_cov_36_479940_1	73043	73143	1	GCTTCAGTGGCGAACGTCGTGAA	1
	CRISPR	NODE_17_length_90484_cov_34_887852_1	44875	45940	17	GTGTTCCCCGCGCCAGCGGGGATAAACCG	4
	Cas cluster	CAS	53640	62090	8	cas2_TypeIE, cas3_TypeI, cas3_TypeI, cas5_TypeIE, cas6_TypeIE, cas7_TypeIE, cse1_TypeIE, cse2_TypeIE	n/a
	Cas cluster	CAS-TypeIE	56315	62090	7	cas1_TypeIE, cas2_TypeIE, cas5_TypeIE, cas6_TypeIE, cas7_TypeIE, cse1_TypeIE, cse2_TypeIE	n/a
	CRISPR	NODE_17_length_90484_cov_34_887852_2	62187	63008	13	GTGTTCCCCGCGCCAGCGGGGATAAACCG	4
16	CRISPR	NODE_6_length_232613_cov_37_748981_1	161979	164084	34	CGGTTTATCCCCGCTAGCGCGGGGAACAC	4
	Cas cluster	CAS-TypeIE	164181	172631	8	cas2_TypeIE, cas1_TypeIE, cas6_TypeIE, cas5_TypeIE, cas7_TypeIE, cse2_TypeIE, cse1_TypeIE, cas3_TypeI	n/a
	CRISPR	NODE_6_length_232613_cov_37_748981_2	180342	181468	18	CGGTTTATCCCCGCTGGCGCGGGGAACAC	4
17	CRISPR	NODE_2_length_609318_cov_42_485205_1	161979	164084	34	CGGTTTATCCCCGCTAGCGCGGGGAACAC	4
	Cas cluster	CAS-TypeIE	164181	172631	8	cas2_TypeIE, cas1_TypeIE, cas6_TypeIE, cas5_TypeIE,	n/a

						cas7_TypeIE, cse2_TypeIE, cse1_TypeIE, cas3_TypeI	
	CRISPR	NODE_2_length_609318_cov_42_485205_2	180342	181468	18	CGGTTTATCCCCGCTGGCGCGGGGAACAC	4
19	CRISPR	NODE_2_length_441043_cov_35_163956_1	27604	27708	1	TGTCCAGCCGGTGTCCAGCCGGTGTCCA	1
	CRISPR	NODE_8_length_223790_cov_38_500905_1	44896	46022	18	GTGTTCCCCGCGCCAGCGGGGATAAACCG	4
	Cas cluster	CAS-TypeIE	53549	62697	8	cas3_TypeI, cse1_TypeIE, cse2_TypeIE, cas7_TypeIE, cas5_TypeIE, cas6_TypeIE, cas1_TypeIE, cas2_TypeIE	n/a
	CRISPR	NODE_8_length_223790_cov_38_500905_2	62782	63542	12	GTGTTCCCCGCGCCAGCGGGGATAAACCG	4
20	CRISPR	NODE_6_length_308845_cov_40_784958_1	245940	246456	8	CGGTTTATCCCCGCTGGCGCGGGGAACAC	4
	Cas cluster	CAS-TypeIE	246553	255012	8	cas2_TypeIE, cas1_TypeIE, cas6_TypeIE, cas5_TypeIE, cas7_TypeIE, cse2_TypeIE, cse1_TypeIE, cas3_TypeI	n/a
	CRISPR	NODE_6_length_308845_cov_40_784958_2	262725	263973	20	CGGTTTATCCCCGCTGGCGCGGGGAACAC	4
21	CRISPR	NODE_5_length_273639_cov_38_559317_1	44875	46429	25	GTGTTCCCCGCGCCAGCGGGGATAAACCG	4
	Cas cluster	CAS-TypeIE	54005	62464	8	cas3_TypeI, cse1_TypeIE, cse2_TypeIE, cas7_TypeIE, cas5_TypeIE, cas6_TypeIE, cas1_TypeIE, cas2_TypeIE	n/a

	CRISPR	NODE_5_length_273639_cov_38_559317_2	62561	63385	13	GTGTTCCCCGCGCCAGCGGGGATAAACCG	4
	CRISPR	NODE_5_length_273639_cov_38_559317_3	63459	63975	8	GTGTTCCCCGCGCCAGCGGGGATAAACCG	4