

Safety Forecast Results

Pre-forecast for 2021 to 2024
Forecast for 2025 to 2028

**Systems Forecasting
& Trends Office**



Forecast Analysis

Generated forecasts for 5 original measures and 8 additional measures

- Fatality
- Fatality Rate
- Serious Injury
- Serious Injury Rate
- Non-Motorized Fatality & Serious Injury
- Unrestrained Occupant Fatality
- Driver or Motorcyclist Fatality with Blood Alcohol Concentration ≥ 0.08
- Speeding Fatality
- Motorcycle Fatality
- Unhelmeted Motorcycle Fatality
- Fatality of Drivers ≤ 20 Years Old
- Pedestrian Fatality
- Bicycle Fatality

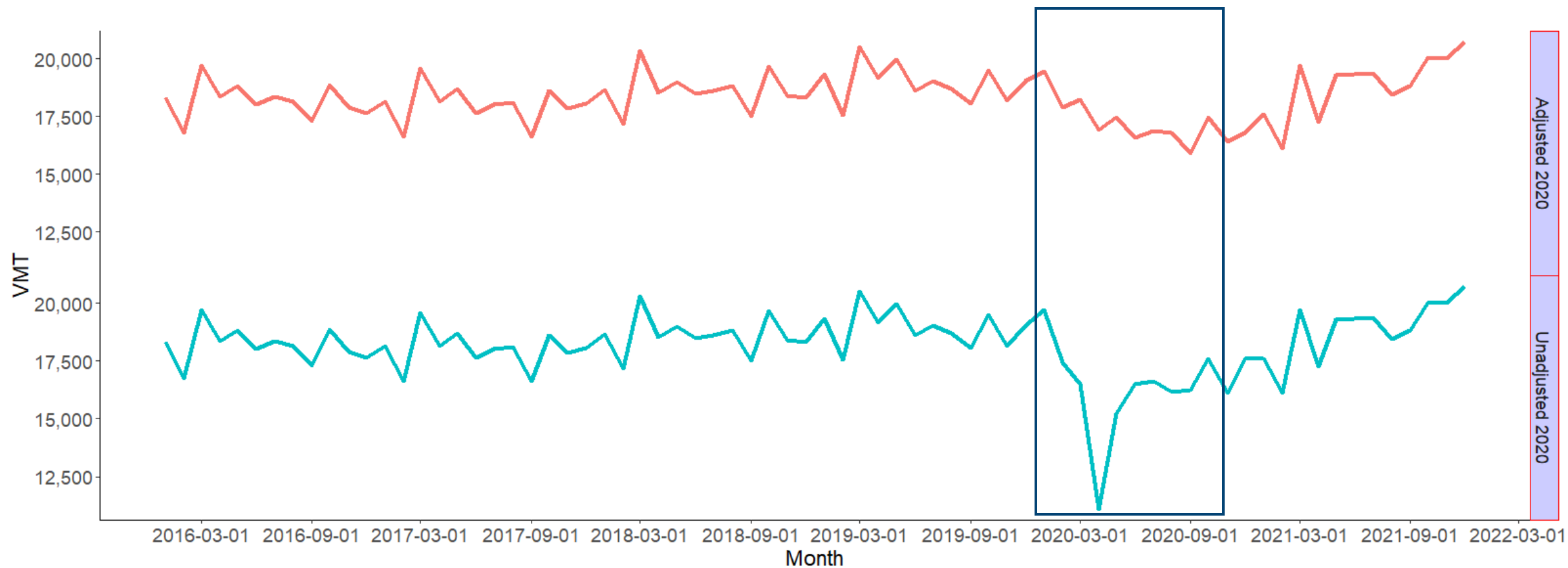
Forecast Analysis (cont.)

- Used data from 2009 through 2020 to develop pre-forecasts for 2021 to 2024
 - *Pre-forecast for Fatalities of Driver or Motorcyclist with ≥ 0.08 Blood Alcohol Concentration was done from 2020 to 2023 due to incomplete 2024 data*
- Used data from 2009 through 2024 to develop forecasts for 2025 to 2028
 - *Forecast for Fatalities of Driver or Motorcyclist with ≥ 0.08 Blood Alcohol Concentration was done from 2024 to 2028 due to incomplete 2024 data*
- For each safety measure, we developed
 - Annual forecast (with 95% confidence intervals)
 - 5-year rolling average forecast (with 95% confidence intervals)

Time Series Model Selection

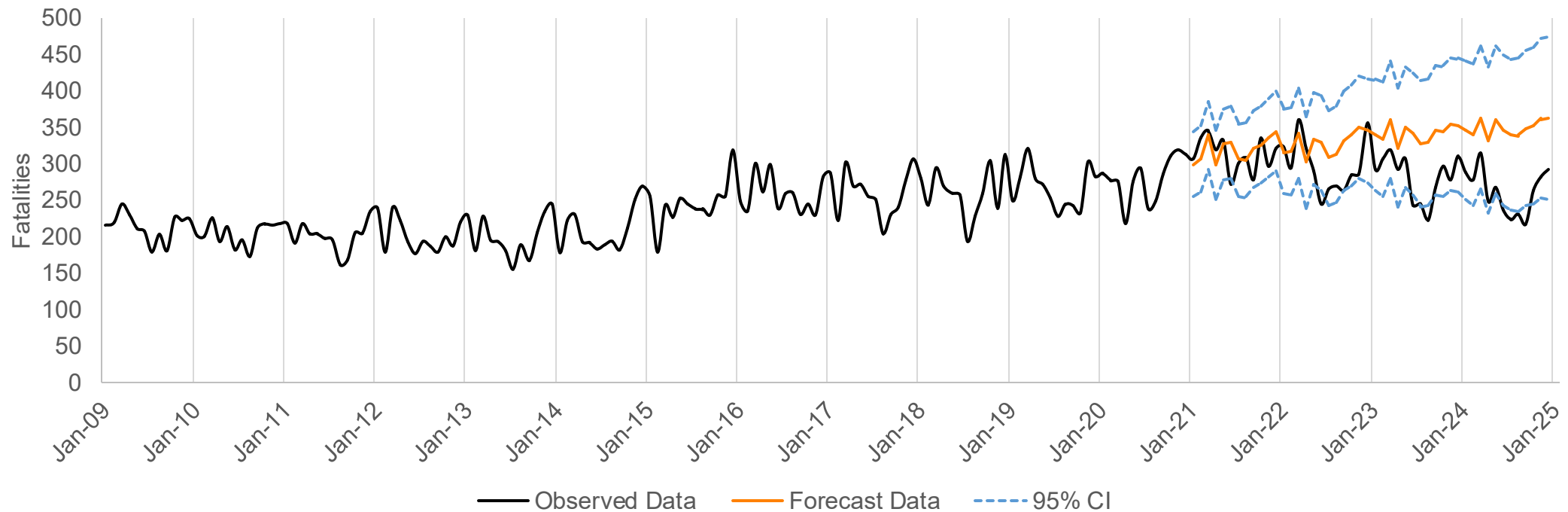
Safety Measure	Time Series Model Selected
Fatality	ARIMA hybrid Regression model with VMT
Fatality Rate	ARIMA model
Serious Injury	ARIMA hybrid Regression model with VMT
Serious Injury Rate	ARIMA model
Non-Motorized Fatality & Serious Injury	ARIMA hybrid Regression model with VMT
Unrestrained Occupant Fatality	ARIMA hybrid Regression model with VMT
Driver or Motorcyclist Fatality with Blood Alcohol Concentration ≥ 0.08	ARIMA hybrid Regression model with VMT
Speeding Fatality	ARIMA hybrid Regression model with VMT
Motorcycle Fatality	ARIMA hybrid Regression model with VMT
Unhelmeted Motorcycle Fatality	ARIMA hybrid Regression model with VMT
Fatality of Drivers ≤ 20 Years Old	ARIMA hybrid Regression model with VMT
Pedestrian Fatality	ARIMA model
Bicycle Fatality	ARIMA model

VMT Adjustment



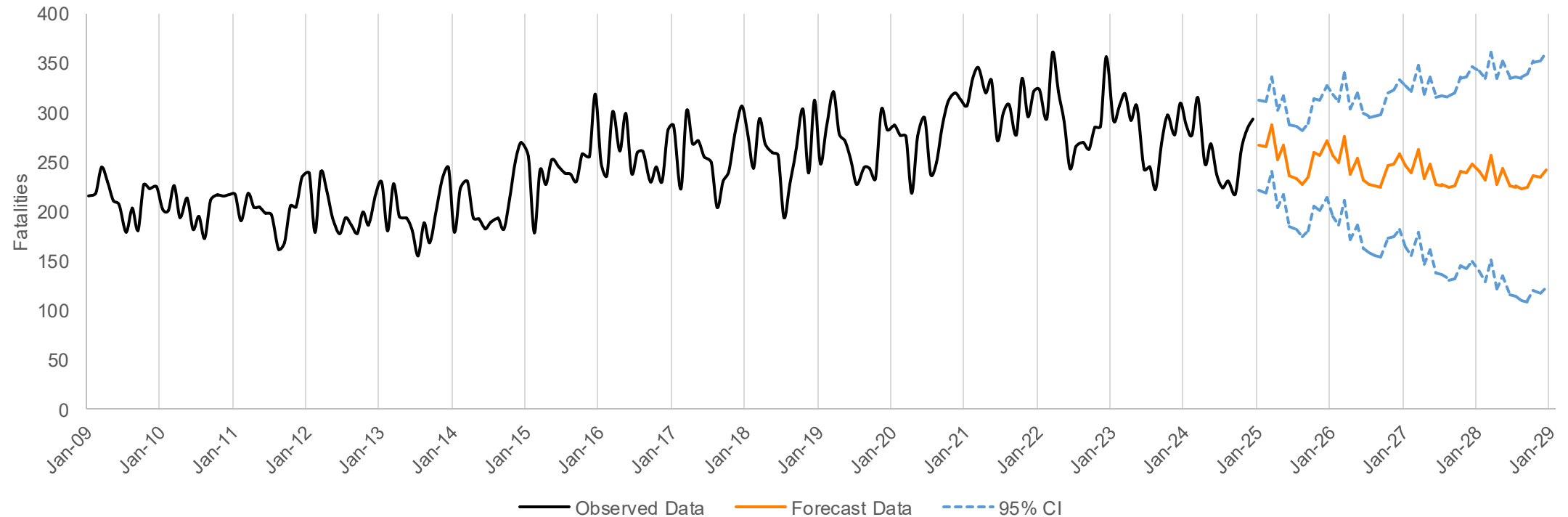
Pre-Forecast – Fatality

95% CI					
Year	Observed	Forecast	Low	High	Forecast vs. Observed
2021	3,749	3,837	3,664	4,010	2.3%
2022	3,558	3,929	3,703	4,156	10.4%
2023	3,379	4,103	3,809	4,396	21.4%
2024	3,146	4,194	4,145	4,244	33.3%



Forecast – Fatality

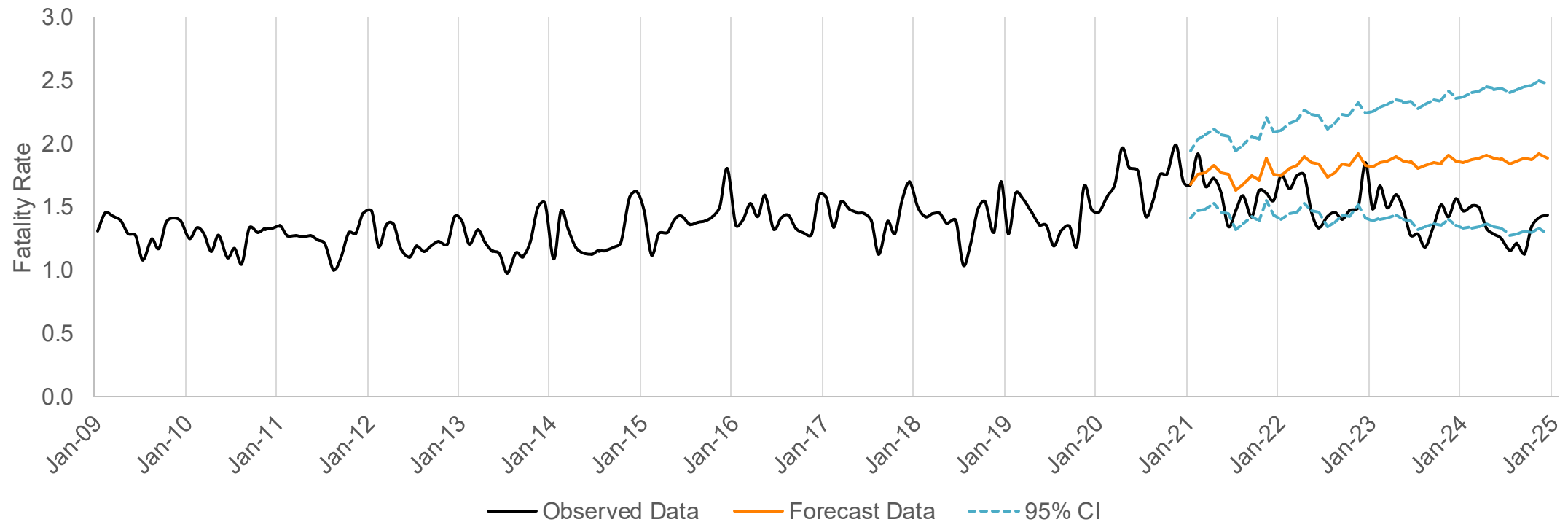
Annual				Five Year Rolling Average			
Year	Point Forecast - Fatalities	Forecast Range - Lower Bound	Forecast Range - Upper bound	Year	Point Forecast Fatalities	Forecast Range - Lower Bound	Forecast Range - Upper bound
2028	2,810	2,427	3,193	2028	2,963	2,699	3,226
2027	2,861	2,549	3,173	2027	3,076	2,867	3,285
2026	2,935	2,697	3,174	2026	3,216	3,032	3,399
2025	3,060	2,882	3,239	2025	3,378	3,208	3,549



Pre-Forecast – Fatality Rate

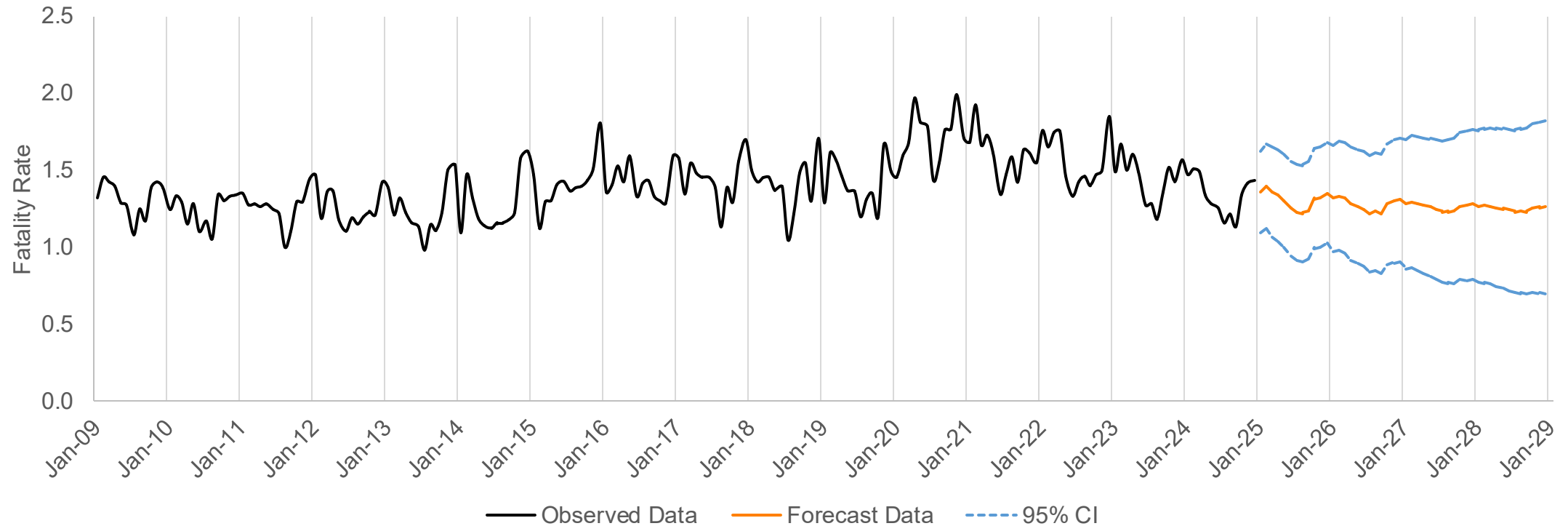
95% CI

Year	Observed	Forecast	Low	High	Forecast vs. Observed
2021	1.60	1.75	1.44	2.05	9.3%
2022	1.57	1.82	1.44	2.21	16.6%
2023	1.44	1.85	1.30	2.41	28.4%
2024	1.34	1.88	1.32	2.44	40.8%



Forecast – Fatality Rate

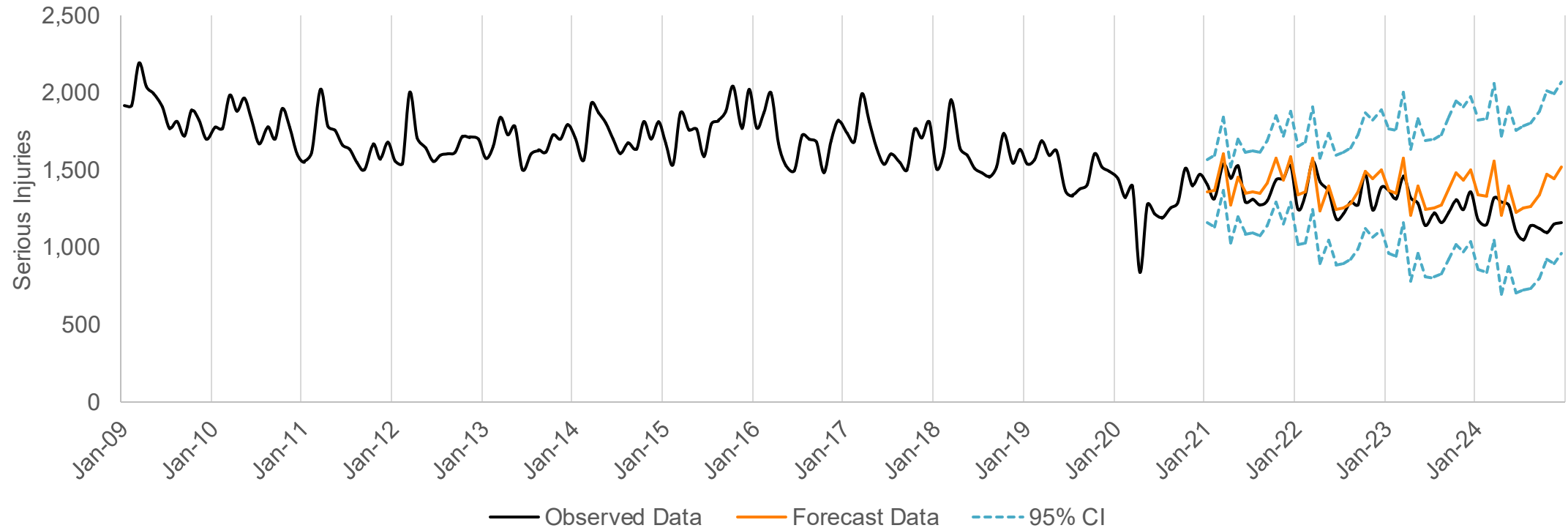
Annual				Five Year Rolling Average			
Year	Point Forecast - Fatality Rate	Forecast Range - Lower Bound	Forecast Range - Upper bound	Year	Point Forecast - Fatality Rate	Forecast Range - Lower Bound	Forecast Range - Upper bound
2028	1.25	0.86	1.64	2028	1.29	0.95	1.62
2027	1.26	0.88	1.64	2027	1.32	1.02	1.63
2026	1.27	0.90	1.65	2026	1.38	1.10	1.67
2025	1.30	1.00	1.61	2025	1.45	1.18	1.72



Pre-Forecast – Serious Injury

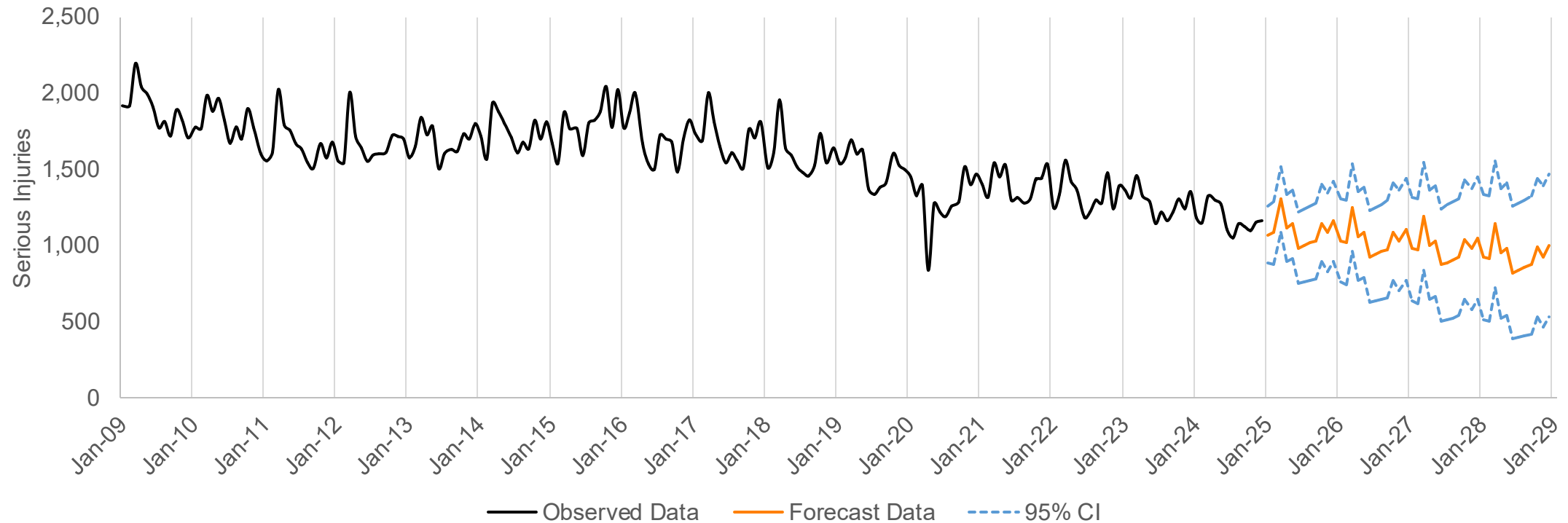
95% CI

Year	Observed	Forecast	Low	High	Forecast vs. Observed
2021	16,835	17,143	16,243	18,042	1.8%
2022	16,010	16,479	15,254	17,705	2.9%
2023	15,401	16,511	14,979	18,043	7.2%
2024	14,043	16,363	16,251	16,474	16.5%



Forecast – Serious Injury

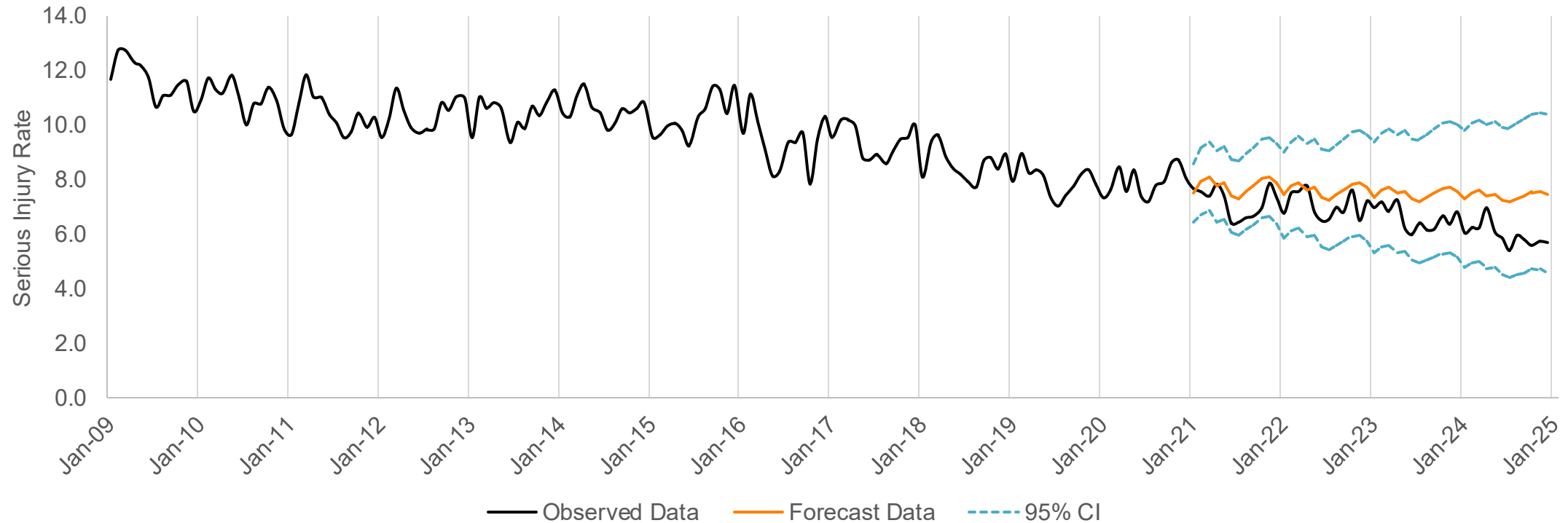
Annual					Five Year Rolling Average			
Year	Point Forecast - Serious Injury	Forecast Range - Lower Bound	Forecast Range - Upper bound		Year	Point Forecast - Serious Injury	Forecast Range - Lower Bound	Forecast Range - Upper bound
2028	11,187	9,667	12,708		2028	12,526	11,427	13,625
2027	11,811	10,519	13,102		2027	13,369	12,491	14,248
2026	12,459	11,400	13,517		2026	14,209	13,514	14,904
2025	13,132	12,321	13,942		2025	15,084	14,541	15,627



Pre-Forecast – Serious Injury Rate

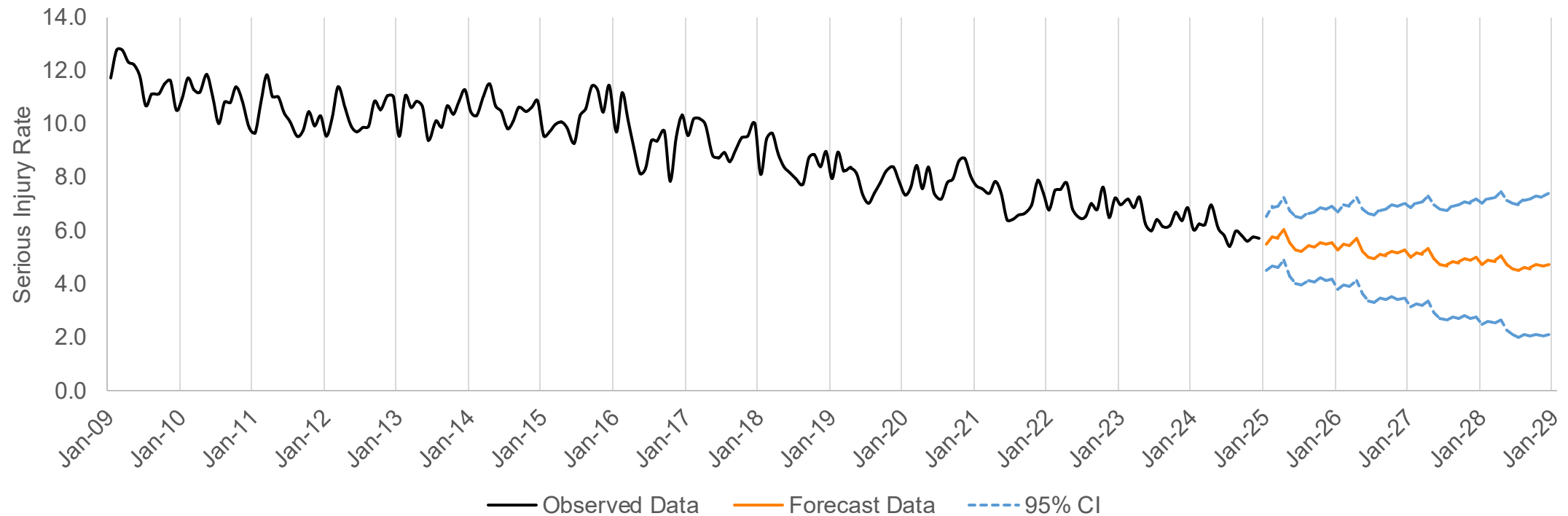
95% CI

Year	Observed	Forecast	Low	High	Forecast vs. Observed
2021	7.18	7.77	6.43	9.11	8.2%
2022	7.05	7.63	5.84	9.41	8.3%
2023	6.59	7.51	5.69	9.33	14.0%
2024	5.97	7.42	5.55	9.28	24.2%



Forecast – Serious Injury Rate

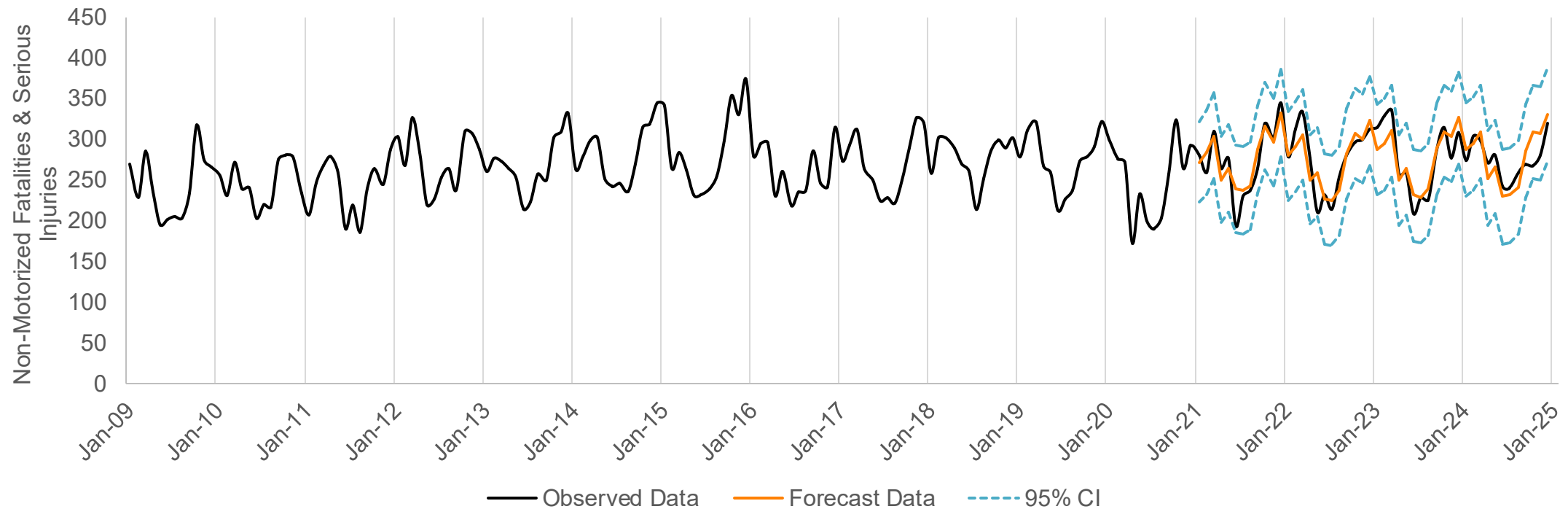
Annual					Five Year Rolling Average			
Year	Point Forecast - Serious Injury Rate	Forecast Range - Lower Bound	Forecast Range - Upper bound		Year	Point Forecast - Serious Injury Rate	Forecast Range - Lower Bound	Forecast Range - Upper bound
2028	4.72	3.03	6.42		2028	5.29	3.85	6.72
2027	4.96	3.30	6.62		2027	5.66	4.42	6.90
2026	5.24	3.61	6.86		2026	6.08	5.00	7.15
2025	5.54	4.30	6.78		2025	6.46	5.59	7.34



Pre-Forecast – Non-Motorized

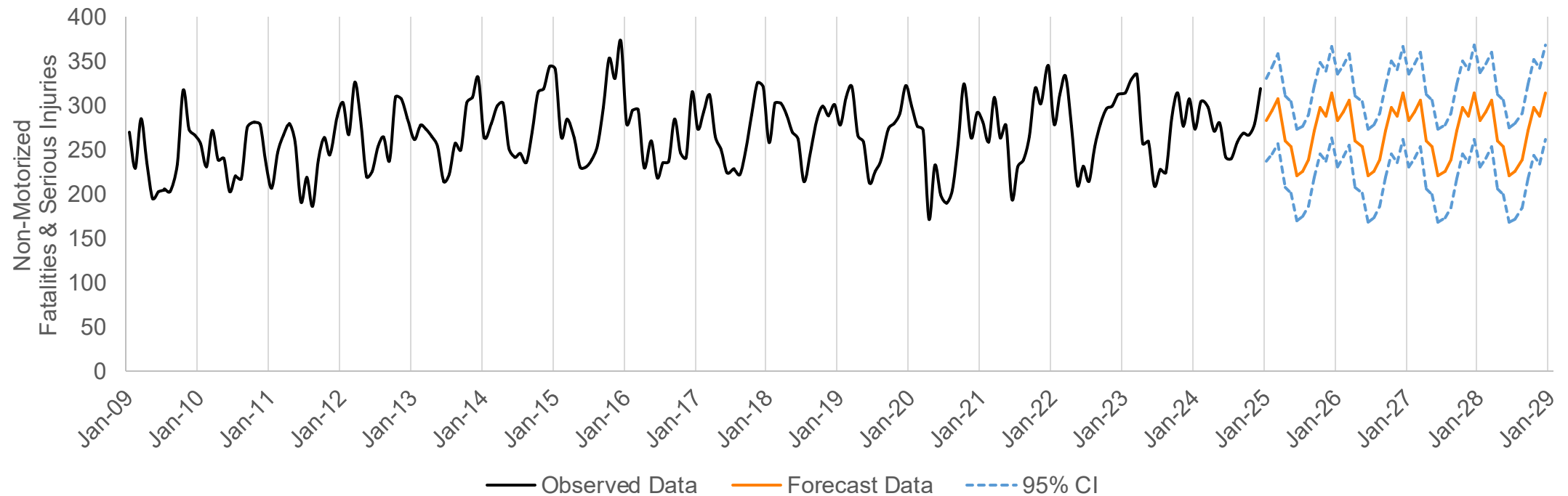
95% CI

Year	Observed	Forecast	Low	High	Forecast vs. Observed
2021	3,283	3,325	3,141	3,509	1.3%
2022	3,298	3,287	3,096	3,477	-0.3%
2023	3,344	3,333	3,138	3,528	-0.3%
2024	3,611	3,343	3,307	3,380	-7.4%



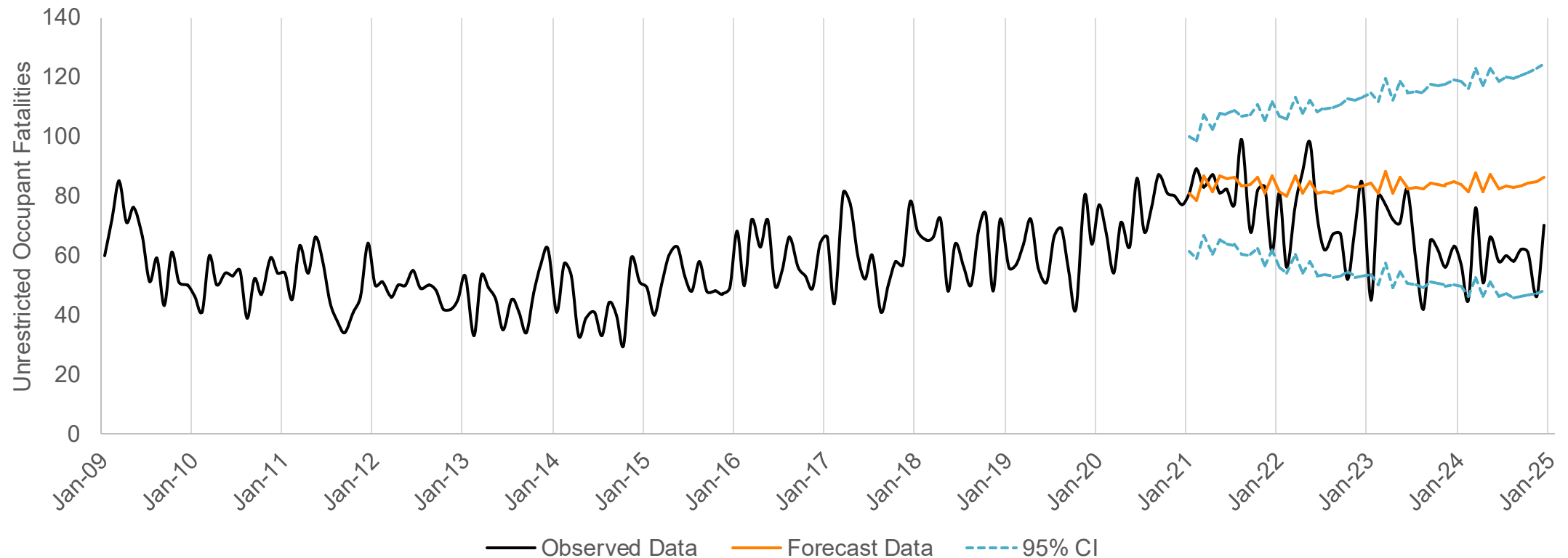
Forecast – Non-Motorized

Annual				Five Year Rolling Average			
Year	Point Forecast - Non-Motorized Fatality & Serious Injury	Forecast Range - Lower Bound	Forecast Range - Upper bound	Year	Point Forecast - Non-Motorized Fatality & Serious Injury	Forecast Range - Lower Bound	Forecast Range - Upper bound
2028	3,252	3,066	3,438	2028	3,263	3,091	3,434
2027	3,252	3,069	3,435	2027	3,281	3,120	3,442
2026	3,252	3,071	3,433	2026	3,290	3,135	3,445
2025	3,254	3,077	3,430	2025	3,296	3,151	3,442



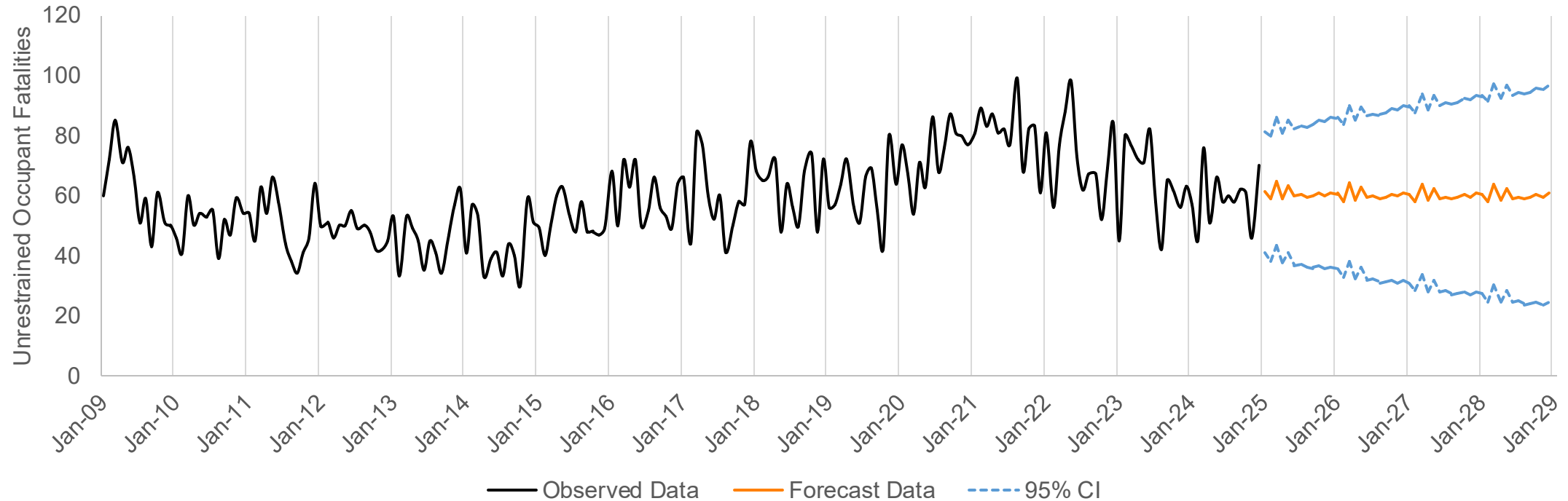
Pre-Forecast – Unrestrained Occupant Fatalities

95% CI					
Year	Observed	Forecast	Low	High	Forecast vs. Observed
2021	973	1,008	931	1,085	3.6%
2022	874	988	892	1,085	13.1%
2023	773	1,005	893	1,117	30.0%
2024	710	1,009	980	1,038	42.1%



Forecast – Unrestrained Occupant Fatalities

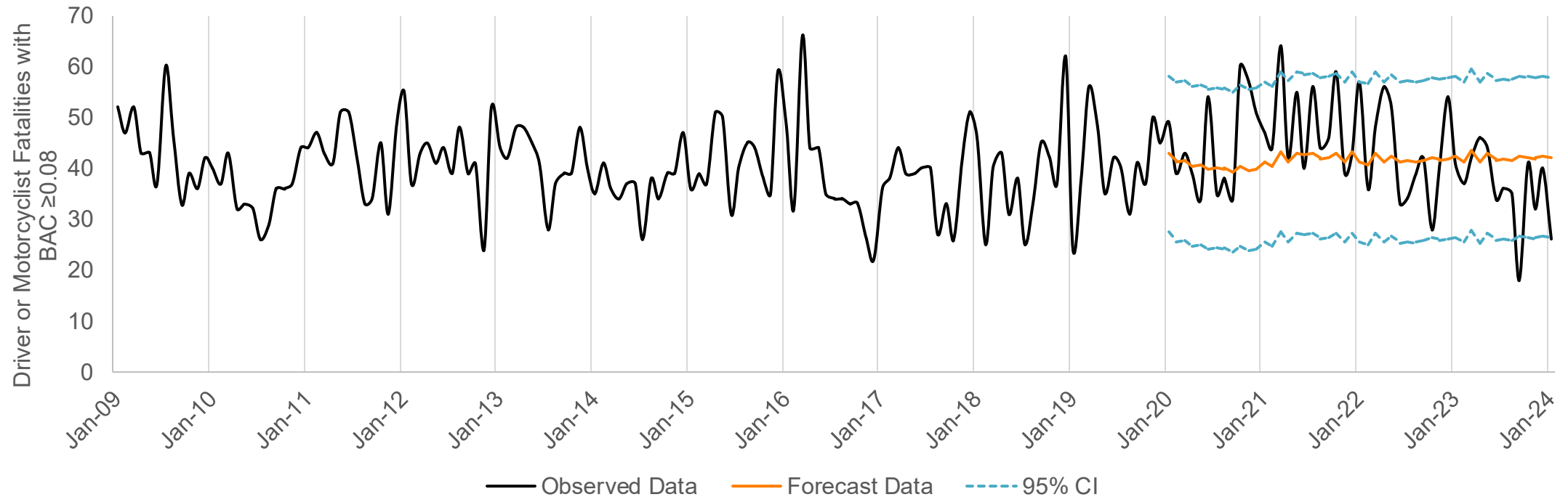
Annual				Five Year Rolling Average			
Year	Point Forecast - Unrestrained Occupant Fatalities	Forecast Range - Lower Bound	Forecast Range - Upper bound	Year	Point Forecast Unrestrained Occupant Fatalities	Forecast Range - Lower Bound	Forecast Range - Upper bound
2028	720	600	840	2028	720	626	814
2027	720	612	829	2027	731	643	819
2026	723	628	817	2026	761	677	845
2025	728	649	806	2025	812	731	892



Pre-Forecast – Blood Alcohol Concentration ≥ 0.08

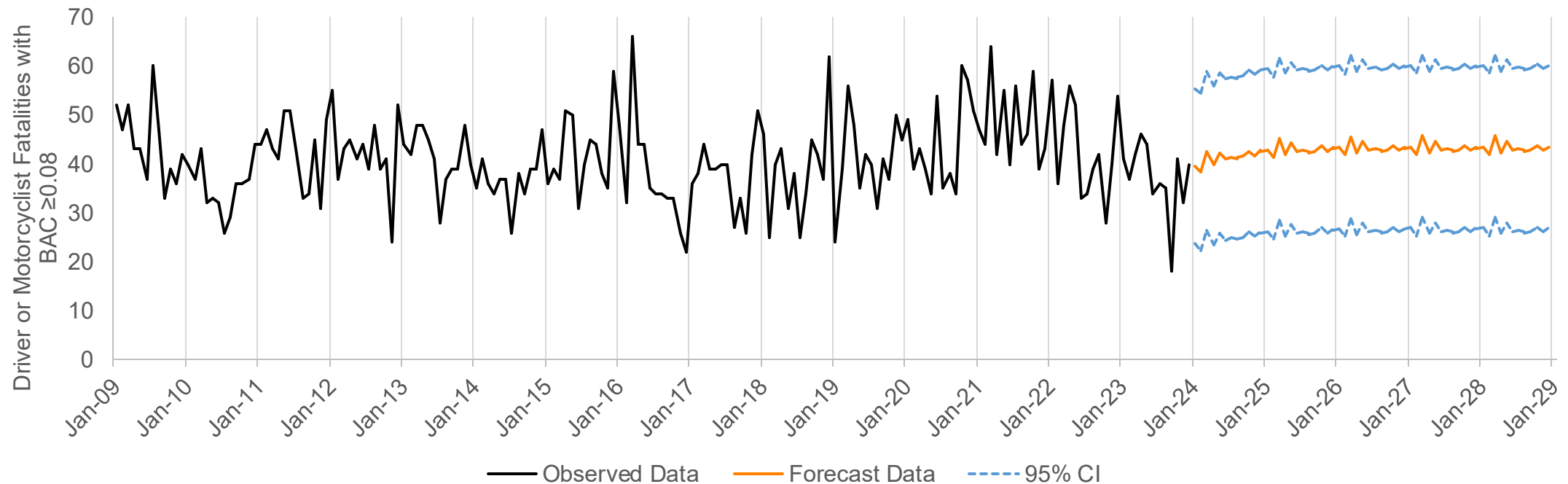
95% CI

Year	Observed	Forecast	Low	High	Forecast vs. Observed
2020	533	487	432	541	-8.7%
2021	579	507	452	561	-12.5%
2022	519	500	446	555	-3.6%
2023	446	506	451	560	13.4%
2024	291	507	452	561	74.2%



Forecast – Blood Alcohol Concentration ≥ 0.08

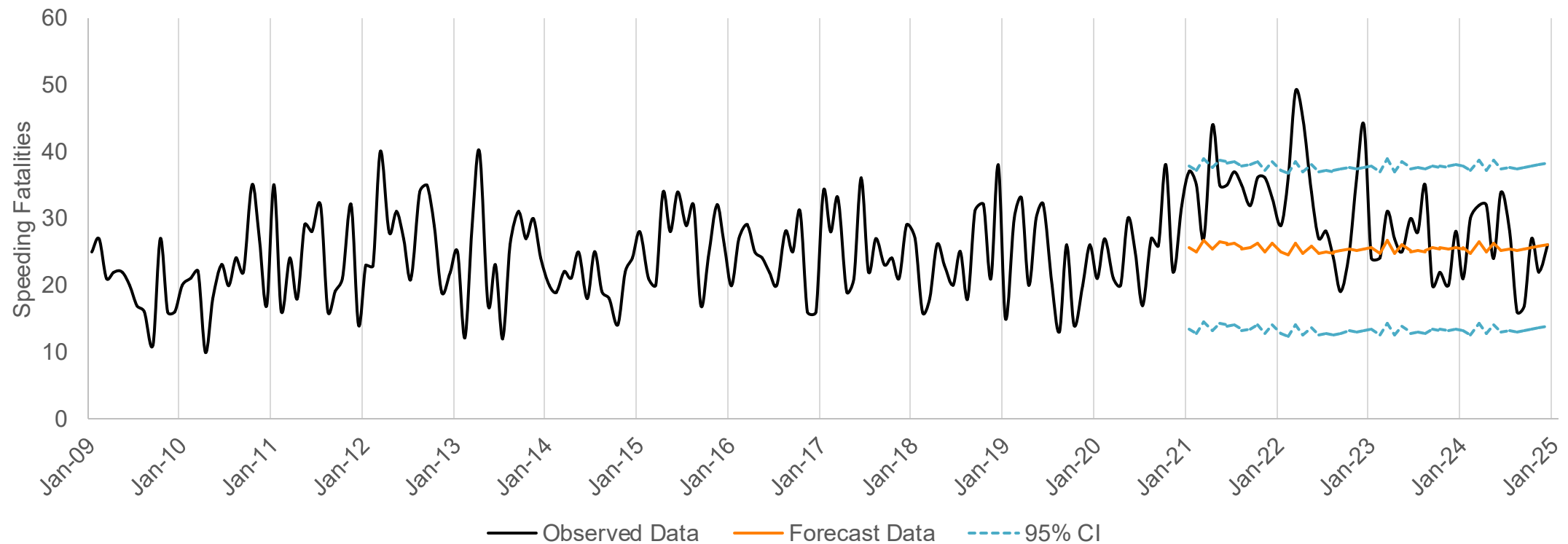
Annual				Five Year Rolling Average			
Year	Point Forecast - Fatalities of Driver or Motorcyclist with .08+ BAC	Forecast Range - Lower Bound	Forecast Range - Upper bound	Year	Point Forecast - Fatalities of Driver or Motorcyclist with .08+ BAC	Forecast Range - Lower Bound	Forecast Range - Upper bound
2028	520	462	578	2028	509	451	566
2027	520	462	578	2027	494	437	551
2026	519	462	577	2026	494	436	552
2025	515	458	573	2025	507	450	564
2024	495	438	552	2024	514	456	573



Pre-Forecast – Speeding Fatalities

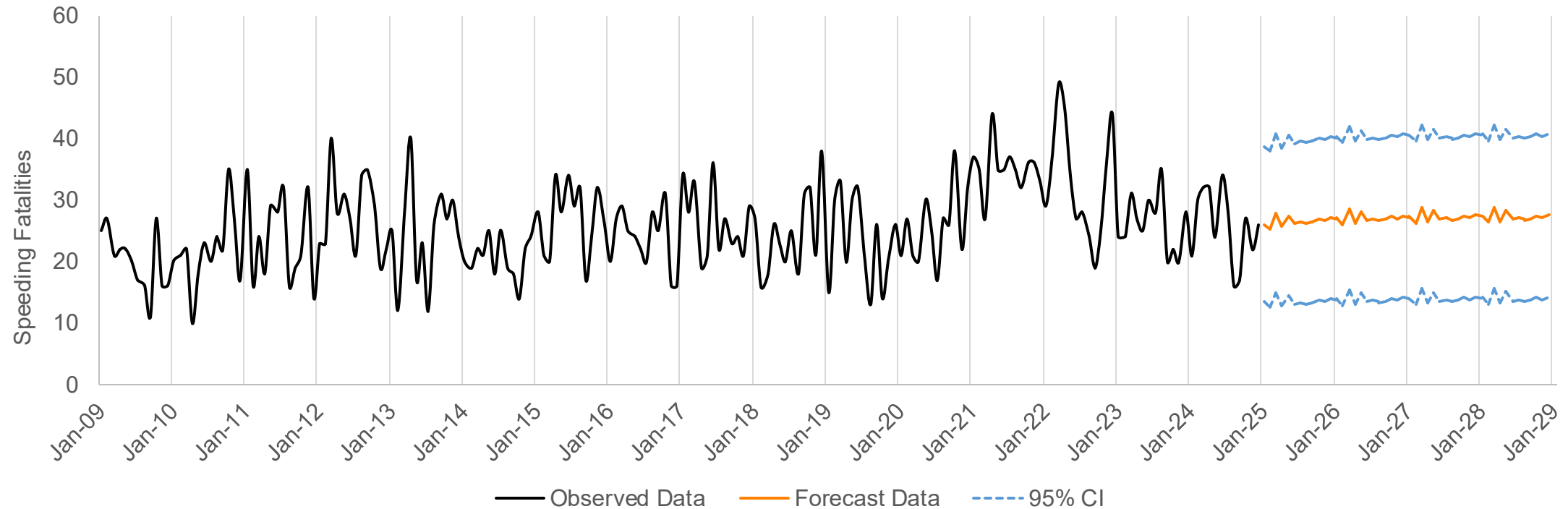
95% CI

Year	Observed	Forecast	Low	High	Forecast vs. Observed
2021	422	310	268	353	-26.4%
2022	396	302	260	345	-23.7%
2023	314	306	263	348	-2.6%
2024	309	307	290	324	-0.7%



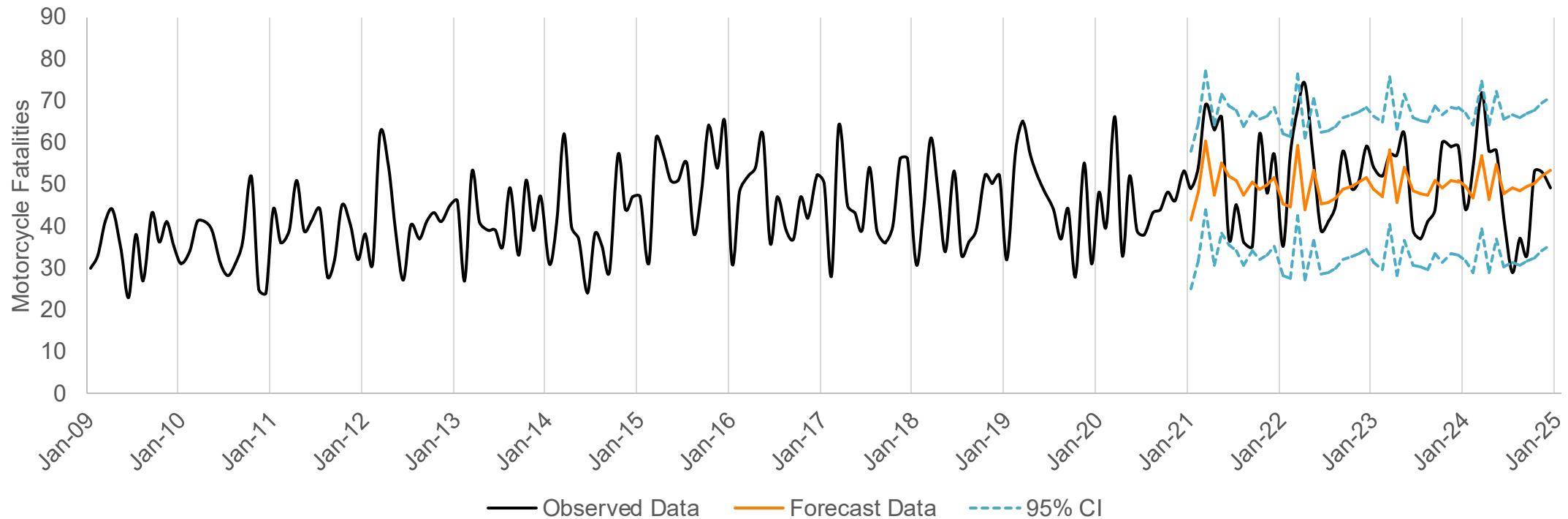
Forecast – Speeding Fatalities

Annual				Five Year Rolling Average			
Year	Point Forecast - Speeding Fatalities	Forecast Range - Lower Bound	Forecast Range - Upper bound	Year	Point Forecast - Speeding Fatalities	Forecast Range - Lower Bound	Forecast Range - Upper bound
2028	327	281	373	2028	321	277	366
2027	327	281	373	2027	319	276	361
2026	325	279	371	2026	332	286	379
2025	318	273	363	2025	352	306	398



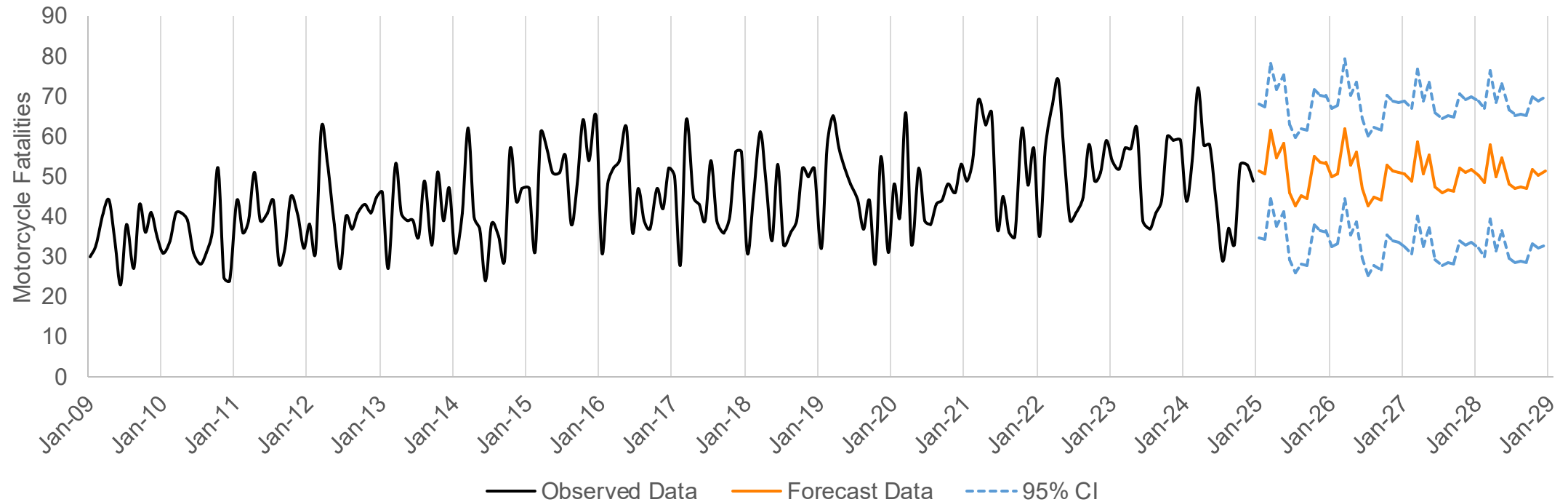
Pre-Forecast – Motorcycle Fatalities

95% CI					
Year	Observed	Forecast	Low	High	Forecast vs. Observed
2021	621	603	545	661	-2.9%
2022	631	585	526	643	-7.3%
2023	621	598	537	659	-3.7%
2024	582	603	583	624	3.6%



Forecast – Motorcycle Fatalities

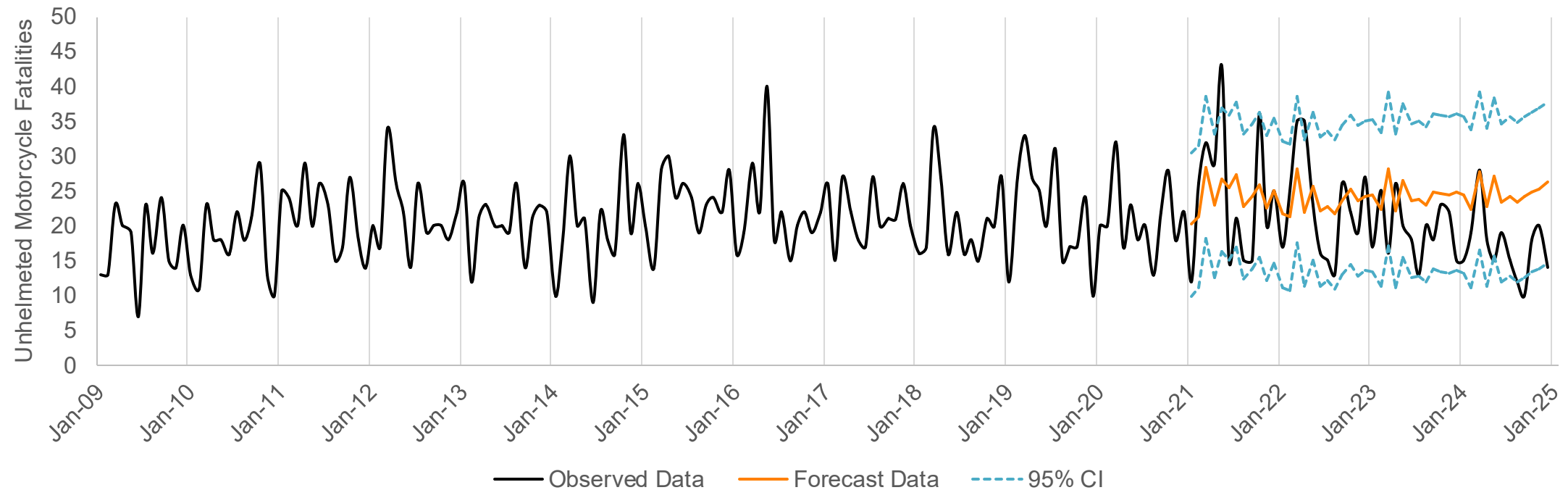
	Annual					Five Year Rolling Average		
Year	Point Forecast - Motorcycle Fatalities	Forecast Range - Lower Bound	Forecast Range - Upper bound		Year	Point Forecast - Motorcycle Fatalities	Forecast Range - Lower Bound	Forecast Range - Upper bound
2028	604	540	668		2028	603	542	663
2027	606	543	669		2027	606	550	662
2026	605	544	665		2026	611	554	668
2025	617	558	675		2025	614	555	674



Pre-Forecast – Unhelmeted Motorcycle Fatalities

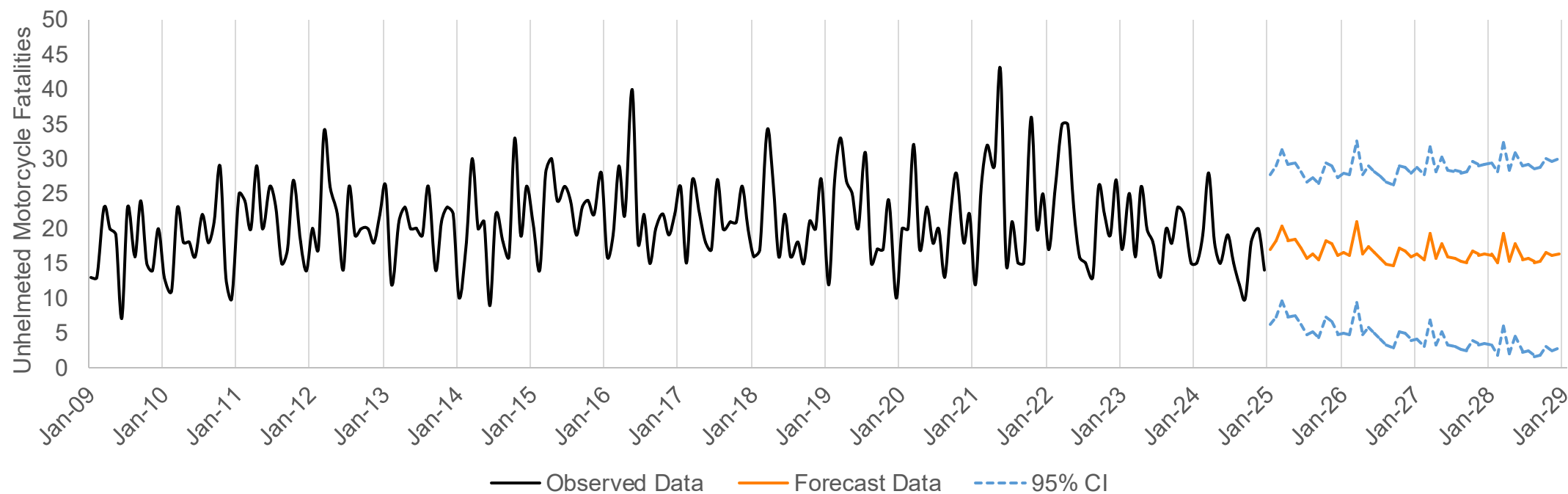
95% CI

Year	Observed	Forecast	Low	High	Forecast vs. Observed
2021	289	293	257	328	1.2%
2022	273	282	245	319	3.2%
2023	233	293	254	331	25.6%
2024	203	296	280	312	45.8%



Forecast – Unhelmeted Motorcycle Fatalities

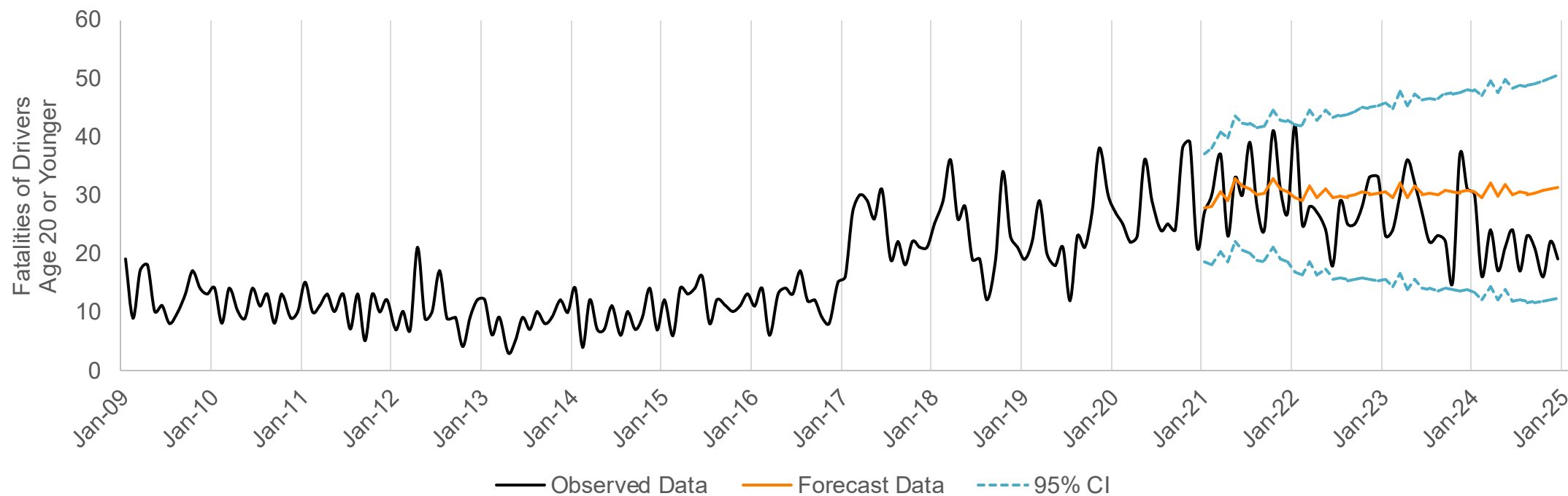
	Annual					Five Year Rolling Average		
Year	Point Forecast – Unhelmeted Motorcycle Fatalities	Forecast Range - Lower Bound	Forecast Range - Upper bound		Year	Point Forecast – Unhelmeted Motorcycle Fatalities	Forecast Range - Lower Bound	Forecast Range - Upper bound
2028	194	148	241		2028	200	160	241
2027	196	153	240		2027	208	170	246
2026	199	159	240		2026	223	186	261
2025	209	171	247		2025	241	200	283



Pre-Forecast – Fatalities of Age ≤ 20

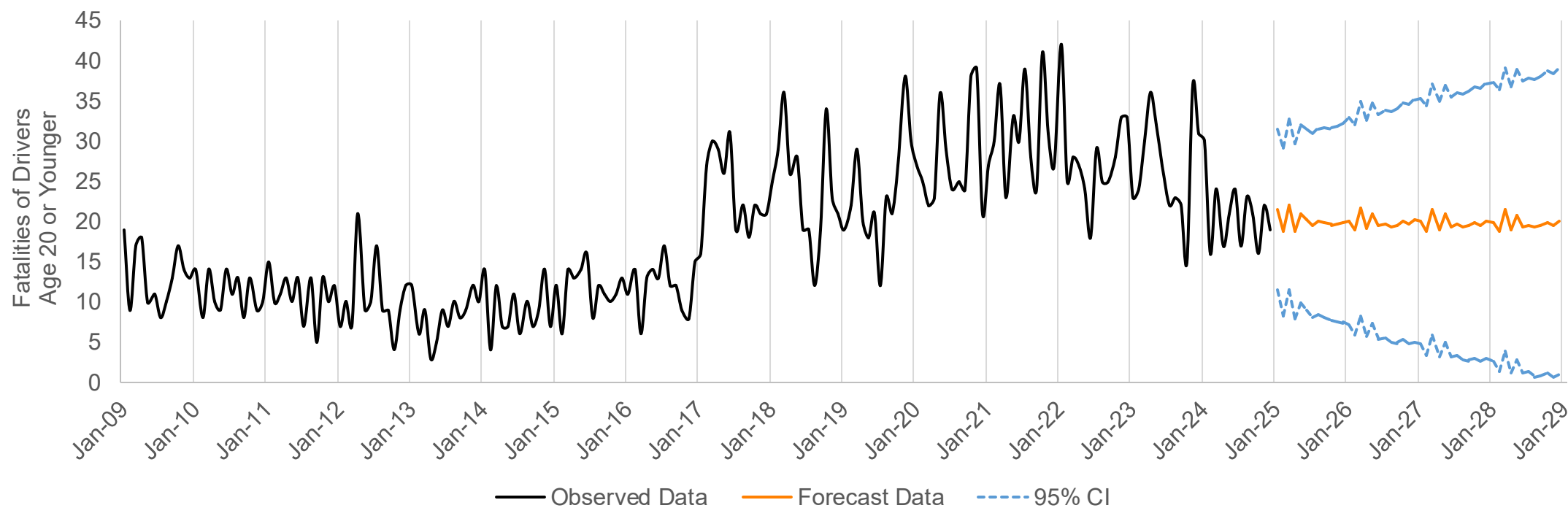
95% CI

Year	Observed	Forecast	Low	High	Forecast vs. Observed
2021	370	366	328	404	-1.1%
2022	337	361	313	409	7.0%
2023	322	367	311	423	13.9%
2024	250	368	347	389	47.2%



Forecast – Fatalities of Age ≤20

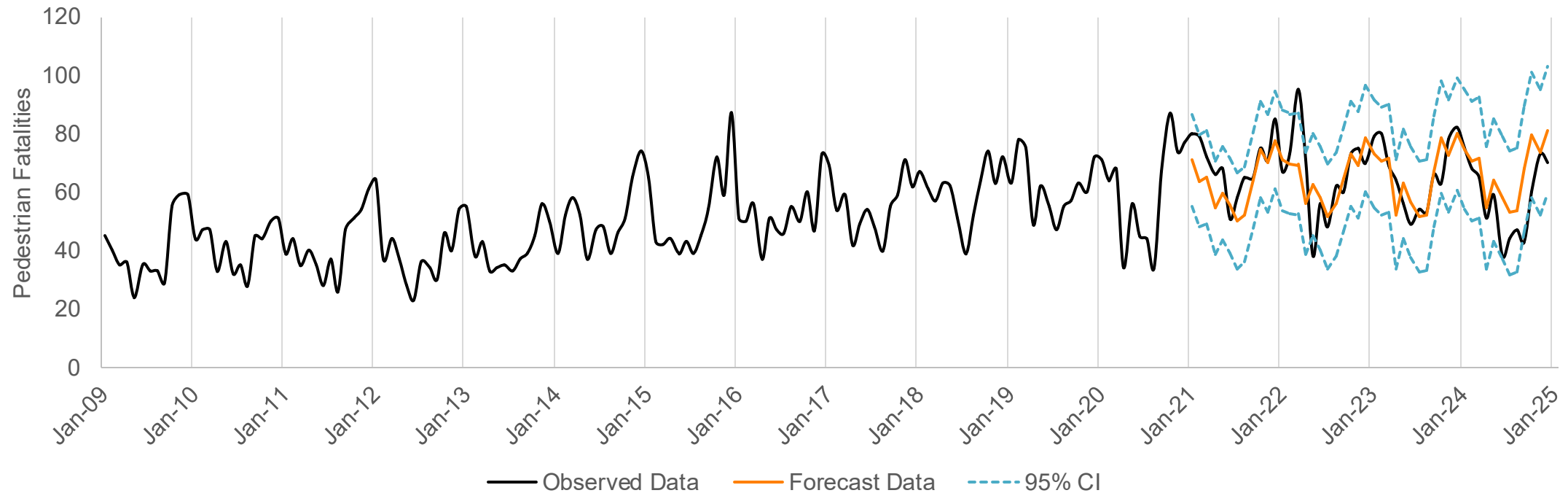
Annual				Five Year Rolling Average			
Year	Point Forecast – Fatalities of Drivers Aged 20 or Less	Forecast Range - Lower Bound	Forecast Range - Upper bound	Year	Point Forecast – Fatalities of Drivers Aged 20 or Less	Forecast Range - Lower Bound	Forecast Range - Upper bound
2028	237	174	300	2028	241	192	290
2027	238	181	294	2027	258	212	303
2026	238	190	287	2026	278	235	320
2025	241	202	280	2025	304	264	344



Pre-Forecast – Pedestrian Fatalities

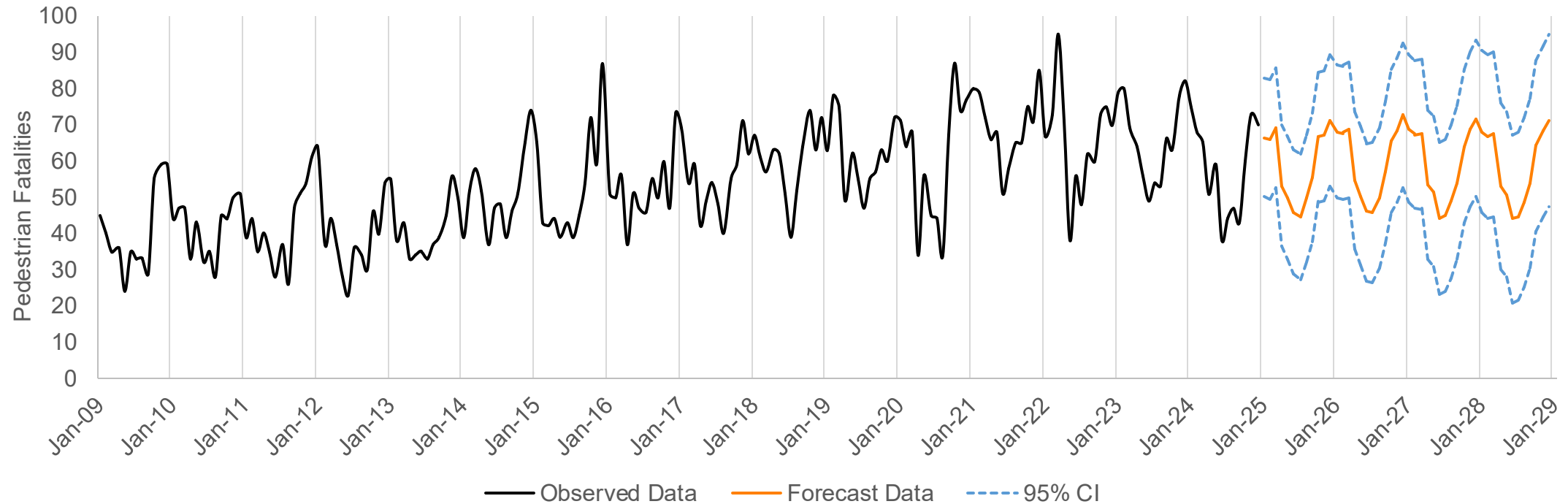
95% CI

Year	Observed	Forecast	Low	High	Forecast vs. Observed
2021	835	759	702	815	-9.2%
2022	788	780	719	841	-1.0%
2023	793	789	723	854	-0.6%
2024	693	803	780	825	15.8%



Forecast – Pedestrian Fatalities

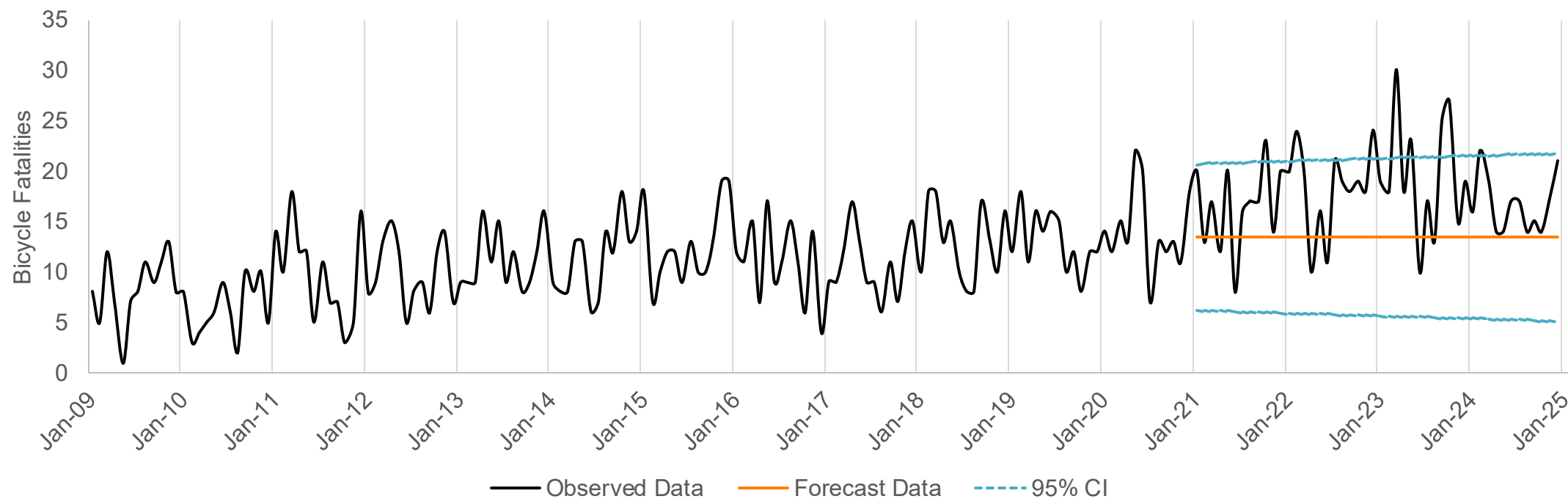
	Annual					Five Year Rolling Average		
Year	Point Forecast – Pedestrian Fatalities	Forecast Range - Lower Bound	Forecast Range - Upper bound		Year	Point Forecast – Pedestrian Fatalities	Forecast Range - Lower Bound	Forecast Range - Upper bound
2028	701	621	781		2028	704	636	771
2027	706	633	778		2027	722	661	783
2026	715	648	782		2026	739	674	803
2025	705	645	765		2025	763	702	824



Pre-Forecast – Bicycle Fatalities

95% CI

Year	Observed	Forecast	Low	High	Forecast vs. Observed
2021	197	162	136	188	-17.8%
2022	220	162	135	189	-26.4%
2023	234	162	134	190	-30.8%
2024	200	162	148	176	-19.0%



Forecast – Bicycle Fatalities

Annual				Five Year Rolling Average			
Year	Point Forecast – Bicycle Fatalities	Forecast Range - Lower Bound	Forecast Range - Upper bound	Year	Point Forecast – Bicycle Fatalities	Forecast Range - Lower Bound	Forecast Range - Upper bound
2028	207	174	240	2028	206	177	235
2027	207	176	239	2027	211	181	242
2026	207	178	237	2026	214	183	244
2025	207	179	235	2025	212	181	242

