2020 Preseason Pink Salmon Forecast

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Objective

To forecast the Southeast Alaska (SEAK) pink salmon harvest in 2020.

Model Selection

Three hierarchical models were investigated. The full model was:

$$E(y) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_1 X_2$$

Table 1: Parameter estimates

X1	term	estimate	std.error	statistic	p.value
1	(Intercept)	1.3427021	7.641121	0.1757206	0.8622804
2	CPUE	14.6533685	2.674148	5.4796395	0.0000231
3	(Intercept)	136.8505836	42.278874	3.2368550	0.0043400
4	CPUE	17.1659248	2.334149	7.3542529	0.0000006
5	ISTI_MJJ	-15.6825735	4.838540	-3.2411791	0.0042981
6	(Intercept)	-2.4558282	126.116094	-0.0194728	0.9846782
7	CPUE	69.5357104	44.781476	1.5527784	0.1378814
8	ISTI_MJJ	-0.2881339	13.992384	-0.0205922	0.9837975
9	CPUE:ISTI_MJJ	-5.7359519	4.898281	-1.1710132	0.2568628

The model summary restults using the metrics AIC, BIC, MAPE (mean absolute percent error), MEAPE (median absolute percent error), and MASE (mean absoluate scaled error) (Hyndman and Kohler 2006)

Table 2: Summary of model outputs

X1	model	AdjR2	AIC	AICc	BIC
1	CPUE	0.5802221	183.8258	185.1592	187.0990
2	CPUE+ISTI_MJJ	0.7154553	176.1430	178.4959	180.5072
3	CPUE+ISTI_MJJ+CPUE:ISTI_MJJ	0.7209090	176.5278	180.2778	181.9830

Table 3: Forecast error measures

X1	model	MAPE	MEAPE	MASE
model.m1	CPUE	0.3071037	0.1807227	0.3013406
model.m2	CPUE+ISTI_MJJ	0.1894439	0.1257433	0.2276793
model.m3	CPUE+ISTI_MJJ+CPUE:ISTI_MJJ	0.2771368	0.1491916	0.2179695

References