

Table S1. Generalized linear model (negative binomial with a log link) results for recruitment signals of age-3 cod at varying spatial scales (abundance at increasing distance from the juvenile survey area) using age-0 cod abundance (mean catch·haul⁻¹)

Predictor	Estimate	SE	z value	p value
Overall model: 100 km	null deviance = 21.8, residual deviance = 18.1, df = 1,15, adj D ² = 0.113			
Intercept	14.34	0.182	78.61	<0.001
Age-0	0.011	0.007	1.734	0.083
Overall model: 150 km	null deviance = 24.8, residual deviance = 18.1, df = 1,15, adj D ² = 0.221			
Intercept	15.27	0.187	81.70	<0.001
Age-0	0.015	0.007	2.23	0.026
Overall model: 200 km	null deviance = 26.1, residual deviance = 18.1, df = 1,15, adj D ² = 0.262			
Intercept	15.94	0.181	88.09	<0.001
Age-0	0.0157	0.007	2.424	0.015
Overall model: 250 km	null deviance = 26.4, residual deviance = 18.0, df = 1,15, adj D ² = 0.274			
Intercept	16.32	0.172	94.90	<0.001
Age-0	0.015	0.006	2.507	0.012
Overall model: 300 km	null deviance = 28.4, residual deviance = 17.9, df = 1,15, adj D ² = 0.325			
Intercept	16.47	0.168	97.83	<0.001
Age-0	0.017	0.006	2.745	0.006
Overall model: 350 km	null deviance = 29.9, residual deviance = 17.9, df = 1,15, adj D ² = 0.359			
Intercept	16.64	0.169	98.41	<0.001
Age-0	0.018	0.006	2.90	0.004
Overall model: 400 km	null deviance = 29.0, residual deviance = 18.2, df = 1,15, adj D ² = 0.337			
Intercept	16.79	0.180	94.44	<0.001
Age-0	0.018	0.006	2.791	0.005
Overall model: 450 km	null deviance = 27.0, residual deviance = 18.2, df = 1,15, adj D ² = 0.283			
Intercept	16.93	0.188	90.27	<0.001
Age-0	0.017	0.007	2.516	0.012
Overall model: 500 km	null deviance = 26.2, residual deviance = 18.2, df = 1,15, adj D ² = 0.258			
Intercept	17.04	0.191	89.28	<0.001
Age-0	0.016	0.007	2.382	0.017
Overall model: 550 km	null deviance = 28.1, residual deviance = 18.2, df = 1,15, adj D ² = 0.308			
Intercept	17.06	0.191	89.35	<0.001
Age-0	0.018	0.007	2.631	0.009

Overall model: 600 km	null deviance = 29.6, residual deviance = 18.2, df = 1,15, adj D ² = 0.345			
Intercept	17.08	0.11	89.20	<0.001
Age-0	0.019	0.007	2.819	0.005
Overall model: 650 km	null deviance = 29.7, residual deviance = 18.2, df = 1,15, adj D ² = 0.347			
Intercept	17.10	0.191	89.58	<0.001
Age-0	0.019	0.007	2.824	0.005
Overall model: 700 km	null deviance = 30.0, residual deviance = 18.2, df = 1,15, adj D ² = 0.353			
Intercept	17.13	0.190	90.22	<0.001
Age-0	0.019	0.007	2.856	0.004
Overall model: 750 km	null deviance = 30.1, residual deviance = 18.2, df = 1,15, adj D ² = 0.355			
Intercept	17.13	0.190	90.38	<0.001
Age-0	0.019	0.007	2.864	0.004
Overall model: 800 km	null deviance = 30.1, residual deviance = 18.2, df = 1,15, adj D ² = 0.355			
Intercept	17.13	0.190	90.37	<0.001
Age-0	0.019	0.007	2.863	0.004
Overall model: 850 km	null deviance = 30.1, residual deviance = 18.2, df = 1,15, adj D ² = 0.355			
Intercept	17.13	0.190	90.37	<0.001
Age-0	0.019	0.007	2.863	0.004

Table S2. Generalized linear model (negative binomial with a log link) results for recruitment signals of age-3 cod at varying spatial scales (abundance at increasing distance from the juvenile survey area) using age-1 cod abundance (mean catch·haul⁻¹)

Predictor	Estimate	SE	z value	p value
Overall model: 100 km	null deviance = 23.1, residual deviance = 19.2, df = 1,16, adj D ² = 0.115			
Intercept	14.31	0.176	81.17	<0.001
Age-1	0.053	0.028	1.881	0.060
Overall model: 150 km	null deviance = 23.4, residual deviance = 19.4, df = 1,16, adj D ² = 0.117			
Intercept	15.31	1.192	79.73	<0.001
Age-1	0.059	0.031	1.927	0.054
Overall model: 200 km	null deviance = 23.5, residual deviance = 19.4, df = 1,16, adj D ² = 0.119			
Intercept	15.99	0.193	82.733	<0.001
Age-1	0.059	0.031	1.912	0.056
Overall model: 250 km	null deviance = 23.7, residual deviance = 19.3, df = 1,16, adj D ² = 0.134			
Intercept	16.36	0.186	88.19	<0.001
Age-1	0.058	0.030	1.954	0.051
Overall model: 300 km	null deviance = 24.9, residual deviance = 19.3, df = 1,16, adj D ² = 0.176			
Intercept	16.52	0.183	90.06	<0.001
Age-1	0.065	0.029	2.23	0.026
Overall model: 350 km	null deviance = 26.3, residual deviance = 19.3, df = 1,16, adj D ² = 0.220			
Intercept	16.70	0.183	91.19	<0.001
Age-1	0.074	0.029	2.523	0.012
Overall model: 400 km	null deviance = 26.4, residual deviance = 19.4, df = 1,16, adj D ² = 0.220			
Intercept	16.80	0.188	89.30	<0.001
Age-1	0.077	0.030	2.554	0.011
Overall model: 450 km	null deviance = 25.3, residual deviance = 19.5, df = 1,16, adj D ² = 0.183			
Intercept	16.94	0.196	86.56	<0.001
Age-1	0.073	0.031	2.346	0.019
Overall model: 500 km	null deviance = 24.9, residual deviance = 19.5, df = 1,16, adj D ² = 0.165			
Intercept	17.04	0.200	85.32	<0.001
Age-1	0.071	0.032	2.209	0.027
Overall model: 550 km	null deviance = 26.8, residual deviance = 19.5, df = 1,16, adj D ² = 0.227			
Intercept	17.05	0.199	85.87	<0.001
Age-1	0.079	0.032	2.498	0.013

Overall model: 600 km	null deviance = 28.6, residual deviance = 19.5, df = 1,16, adj D ² = 0.276				
Intercept	17.06	0.198	86.36	<0.001	
Age-1	0.086	0.032	2.712	0.007	
Overall model: 650 km	null deviance = 28.5, residual deviance = 19.5, df = 1,16, adj D ² = 0.274				
Intercept	17.09	0.198	86.55	<0.001	
Age-1	0.086	0.032	2.719	0.007	
Overall model: 700 km	null deviance = 28.6, residual deviance = 19.5, df = 1,16, adj D ² = 0.277				
Intercept	17.11	0.197	86.91	<0.001	
Age-1	0.087	0.032	2.75	0.006	
Overall model: 750 km	null deviance = 28.7, residual deviance = 19.5, df = 1,16, adj D ² = 0.278				
Intercept	17.12	0.197	86.99	<0.001	
Age-1	0.087	0.032	2.757	0.006	
Overall model: 800 km	null deviance = 28.7, residual deviance = 19.5, df = 1,16, adj D ² = 0.277				
Intercept	17.12	0.197	86.97	<0.001	
Age-1	0.087	0.032	2.756	0.006	
Overall model: 850 km	null deviance = 28.7, residual deviance = 19.5, df = 1,16, adj D ² = 0.277				
Intercept	17.12	0.197	86.97	<0.001	
Age-1	0.087	0.031	2.755	0.006	

Table S3. Generalized linear model (negative binomial with a log link) results for recruitment signals of age-3 cod at varying spatial scales (abundance within each NAFO division) using age-0 cod abundance (mean catch·haul⁻¹). Negative adjusted D² values were set to zero to signify the lack of model fit.

Predictor	Estimate	SE	z value	p value
Overall model: 2J	null deviance = 34.0, residual deviance = 18.9, df = 1,15, adj D ² = 0.408			
Intercept	15.71	0.243	64.76	<0.001
Age-0	0.028	0.009	3.179	0.0015
Overall model: 3K	null deviance = 35.5, residual deviance = 18.0, df = 1,15, adj D ² = 0.460			
Intercept	16.26	0.172	94.41	<0.001
Age-0	0.021	0.006	3.49	<0.001
Overall model: 3L	null deviance = 18.8, residual deviance = 18.6, df = 1,15, adj D ² = 0.000			
Intercept	16.08	0.223	72.11	<0.001
Age-0	0.003	0.008	0.41	0.682

Table S4. Generalized linear model (negative binomial with a log link) results for recruitment signals of age-3 cod at varying spatial scales (each NAFO division) using age-1 cod abundance (mean catch·haul⁻¹). Negative adjusted D² values were set to zero to signify the lack of model fit.

Predictor	Estimate	SE	z value	p value
Overall model: 2J	null deviance = 36.3, residual deviance = 20.0, df = 1,16, adj D ² = 0.417			
Intercept	15.70	0.227	69.05	<0.001
Age-1	0.132	0.036	3.636	<0.001
Overall model: 3K	null deviance = 30.0, residual deviance = 19.4, df = 1,16, adj D ² = 0.314			
Intercept	16.27	0.190	85.81	<0.001
Age-1	0.096	0.030	3.163	0.002
Overall model: 3L	null deviance = 20.0, residual deviance = 19.9, df = 1,16, adj D ² = 0.000			
Intercept	16.04	0.224	71.62	<0.001
Age-1	0.01	0.036	0.344	0.731

Table S5. Generalized linear model (negative binomial with a log link) results for recruitment signals of age-3 cod using November age-0 cod abundance (mean catch·haul⁻¹) and interactions with environmental and biological factors.

Predictor	Estimate	SE	z value	p value
Overall model	null deviance = 32.4, residual deviance = 18.1, df = 3,13, adj D ² = 0.312			
Intercept	17.27	0.222	77.691	<0.001
Age-0	0.009	0.012	0.760	0.447
Summer and autumn water temperature anomaly	-0.309	0.289	-1.071	0.284
Age-0 * Summer and autumn water temperature anomaly	0.016	0.016	1.037	0.300
Overall model	null deviance = 31.5, residual deviance = 18.1, df = 3,13, adj D ² = 0.292			
Intercept	17.172	0.192	89.439	<0.001
Age-0	0.014	0.010	1.420	0.156
Winter water temperature anomaly	-0.411	0.738	-0.557	0.577
Age-0 * Winter water temperature anomaly	-0.013	0.032	-0.406	0.685
Overall model	null deviance = 39.8, residual deviance = 17.9, df = 3,13, adj D ² = 0.446			
Intercept	19.249	0.880	21.863	<0.001
Age-0	-0.008	0.057	-0.140	0.889
Winter duration	-0.023	0.009	-2.501	0.012
Age-0 * Winter duration	0	0.001	0.593	0.553
Overall model	null deviance = 91.2, residual deviance = 17.4, df = 3,13, adj D ² = 0.765			
Intercept	13.028	0.907	14.369	<0.001
Age-0	0.082	0.059	1.386	0.166
Percent eelgrass	0.051	0.011	4.646	<0.001
Age-0 * Percent eelgrass	-0.001	0.001	-1.140	0.254
Overall model	null deviance = 30.0, residual deviance = 11.3, df = 3,7, adj D ² = 0.459			
Intercept	17.231	0.200	86.173	<0.001
Age-0	0.015	0.010	1.484	0.138
Autumn chlorophyll-a	0.436	0.461	0.946	0.344
Age-0 * Autumn chlorophyll-a	0.042	0.089	0.476	0.634
Overall model	null deviance = 27.4, residual deviance = 11.4, df = 3,7, adj D ² = 0.408			
Intercept	16.808	1.067	15.755	<0.001
Age-0	0.051	0.035	1.453	0.146
Spring chlorophyll-a	1.942	3.153	0.616	0.538
Age-0 * Spring chlorophyll-a	-0.121	0.125	-0.964	0.335

Overall model	null deviance = 60.1, residual deviance = 17.6, df = 3,13, adj D ² = 0.639			
Intercept	21.214	0.842	25.188	<0.001
Age-0	-0.086	0.042	-2.024	0.043
Body length	-0.076	0.015	-5.066	<0.001
Age-0 * Body length	0.002	0.001	2.733	0.006

Table S6. Generalized linear model (negative binomial with a log link) results for recruitment signals of age-3 cod using October age-1 cod abundance (mean catch·haul⁻¹) and interactions with environmental and biological factors.

Predictor	Estimate	SE	z value	p value
Overall model	null deviance = 30.2, residual deviance = 19.4, df = 3,14, adj D ² = 0.220			
Intercept	17.099	0.195	87.513	<0.001
Age-1	0.01	0.078	0.128	0.898
Summer and autumn water temperature anomaly	-0.085	0.300	-0.284	0.776
Age-1 * Summer and autumn water temperature anomaly	0.168	0.161	1.040	0.298
Overall model	null deviance = 38.2, residual deviance = 19.1, df = 3,14, adj D ² = 0.392			
Intercept	17.259	0.187	92.471	<0.001
Age-1	-0.034	0.061	-0.558	0.577
Winter water temperature anomaly	-1.037	0.650	-1.595	0.111
Age-1 * Winter water temperature anomaly	-0.198	0.139	-1.421	0.155
Overall model	null deviance = 32.0, residual deviance = 19.3, df = 3,14, adj D ² = 0.266			
Intercept	17.832	0.953	18.717	<0.001
Age-1	-0.352	0.258	-1.363	0.173
Winter duration	-0.007	0.009	-0.732	0.464
Age-1 * Winter duration	0.004	0.002	1.686	0.092
Overall model	null deviance = 94.0, residual deviance = 17.4, df = 3,13, adj D ² = 0.772			
Intercept	13.062	0.670	19.488	<0.001
Age-1	0.174	0.124	1.398	0.162
Percent eelgrass	0.05	0.008	6.053	<0.001
Age-1 * Percent eelgrass	-0.001	0.001	-0.801	0.423
Overall model	null deviance = 31.4, residual deviance = 12.4, df = 3,8, adj D ² = 0.458			
Intercept	17.117	0.233	73.573	<0.001
Age-1	0.126	0.034	3.734	<0.001

Autumn chlorophyll-a	0.283	0.436	0.649	0.516
Age-1 * Autumn chlorophyll-a	0.908	0.403	2.252	0.024
Overall model	null deviance = 24.5, residual deviance = 12.5, df = 3,8, adj D ² = 0.300			
Intercept	18.82	1.351	13.925	<0.001
Age-1	0.057	0.218	0.261	0.794
Spring chlorophyll-a	-4.142	3.938	-1.052	0.293
Age-1 * Spring chlorophyll-a	0.001	0.662	0.001	0.999
Overall model	null deviance = 40.1, residual deviance = 15.9, df = 3,11, adj D ² = 0.495			
Intercept	10.308	3.158	3.264	0.001
Age-1	-0.435	0.355	-1.227	0.220
Body length	0.039	0.019	1.990	0.047
Age-1 * Body length	0.004	0.003	1.731	0.083

Table S7. General linear model results for relationship between November age-0 abundance and October age-1 abundance (mean catch·haul⁻¹; both log-transformed + 1) and interactions with and without environmental and biological factors.

Predictor	Estimate	SE	t value	p value
Overall model	Residual SE = 0.654, p = <0.001, F = 19.737, df = 1,16, adj R ² = 0.524			
Intercept	-0.094	0.296	-0.319	0.754
Age-0	0.513	0.115	4.443	<0.001
Overall model	Residual SE = 0.651, p = 0.003, F = 7.38, df = 3,14, adj R ² = 0.530			
Intercept	0.239	0.383	0.626	0.542
Age-0	0.374	0.148	2.522	0.024
Summer and autumn water temperature anomaly	-0.688	0.512	-1.344	0.200
Age-0 * Summer and autumn water temperature anomaly	0.322	0.219	1.472	0.163
Overall model	Residual SE = 0.610, p = 0.001, F = 9.04, df = 3,14, adj R ² = 0.587			
Intercept	-0.196	0.288	-0.682	0.506
Age-0	0.581	0.120	4.853	<0.001
Winter water temperature anomaly	0.433	1.091	0.397	0.698
Age-0 * Winter water temperature anomaly	0.274	0.445	0.614	0.549
Overall model	Residual SE = 0.645, p = 0.003, F = 7.58, df = 3,14, adj R ² = 0.537			

Intercept	-1.908	1.390	-1.373	0.191
Age-0	1.687	0.760	2.220	0.043
Winter duration	0.017	0.013	1.352	0.198
Age-0 * Winter duration	-0.011	0.007	-1.563	0.140
Overall model	Residual SE = 0.685, p = 0.007, F = 6.21, df = 3,14, adj R ² = 0.479			
Intercept	0.230	3.126	0.074	0.942
Age-0	0.645	1.202	0.537	0.600
Percent eelgrass	-0.004	0.037	-0.120	0.906
Age-0 * Percent eelgrass	-0.001	0.014	-0.106	0.917
Overall model	Residual SE = 0.657, p = 0.016, F = 6.03, df = 3,9, adj R ² = 0.557			
Intercept	-0.110	0.388	-0.283	0.784
Age-0	0.436	0.152	2.863	0.019
Autumn chlorophyll-a	-1.008	1.401	-0.720	0.490
Age-0 * Autumn chlorophyll-a	0.846	1.011	0.837	0.424
Overall model	Residual SE = 0.500, p = 0.001, F = 12.6, df = 3,9, adj R ² = 0.744			
Intercept	0.327	1.493	0.219	0.831
Age-0	1.093	0.490	2.229	0.053
Spring chlorophyll-a	-0.824	4.432	-0.186	0.857
Age-0 * Spring chlorophyll-a	-2.401	1.611	-1.490	0.170
Overall model	Residual SE = 0.664, p = 0.004, F = 6.89, df = 3,14, adj R ² = 0.510			
Intercept	1.032	2.100	0.492	0.631
Age-0	-0.372	0.869	-0.428	0.675
Body length	-0.019	0.038	-0.495	0.629
Age-0 * Body length	0.014	0.015	0.968	0.349

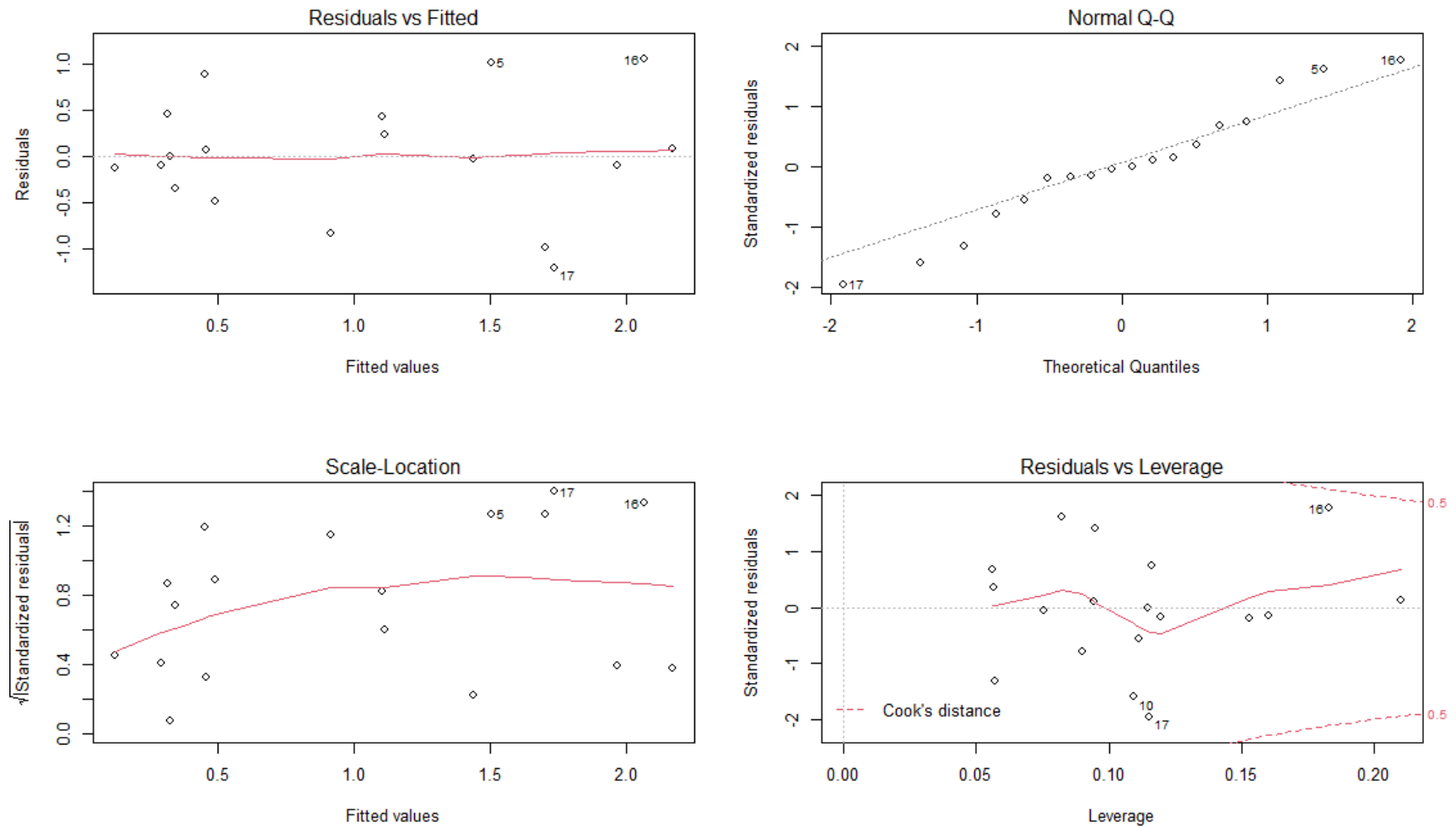


Figure S1. General linear model diagnostic plots for models comparing November age-0 abundance and October age-1 abundance (mean catch \cdot haul $^{-1}$; both log-transformed + 1)

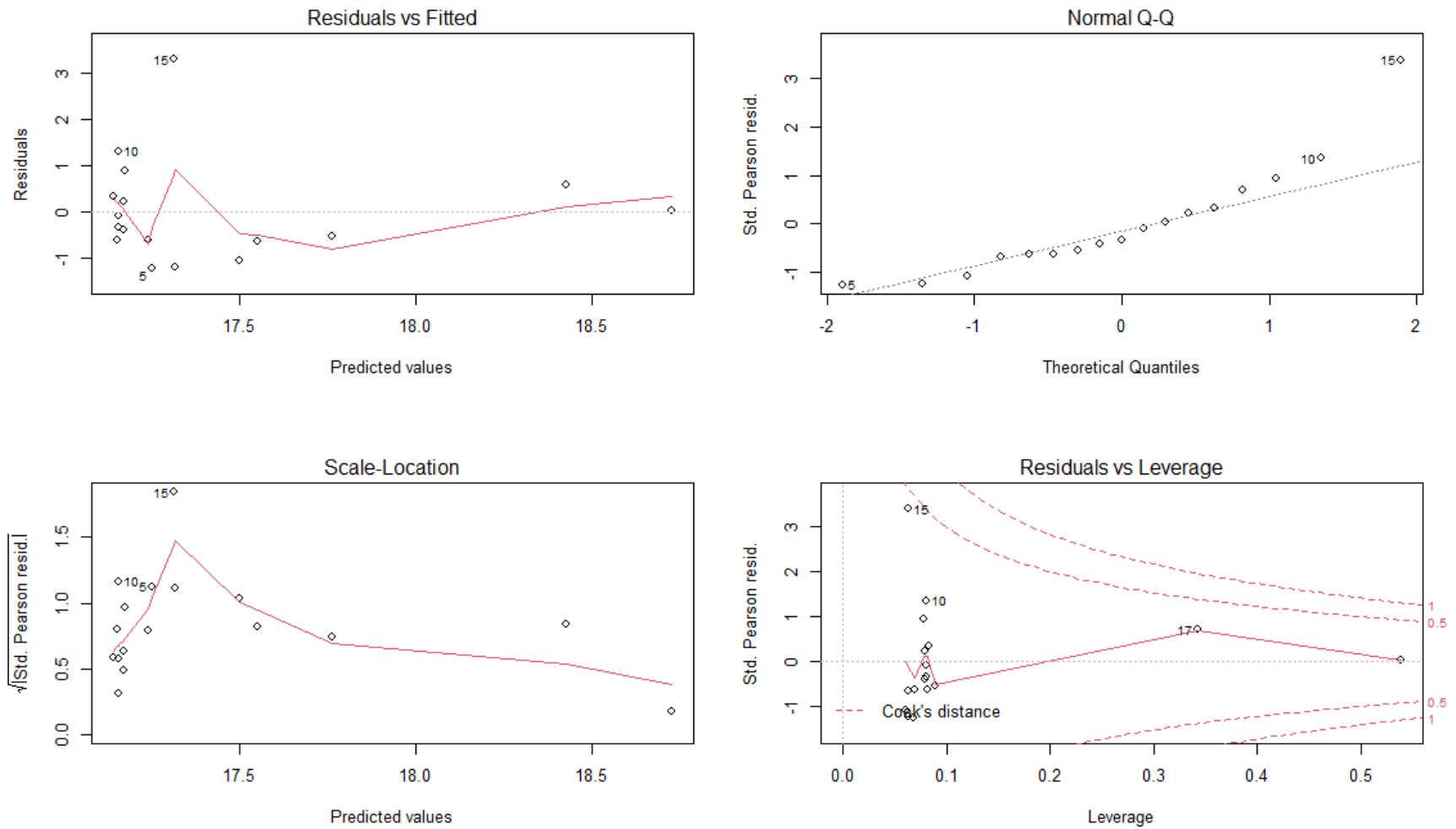


Figure S2. Generalized linear model (negative binomial with a log link) diagnostic plots for recruitment signals of age-3 abundance using November age-0 abundance (mean catch·haul⁻¹)

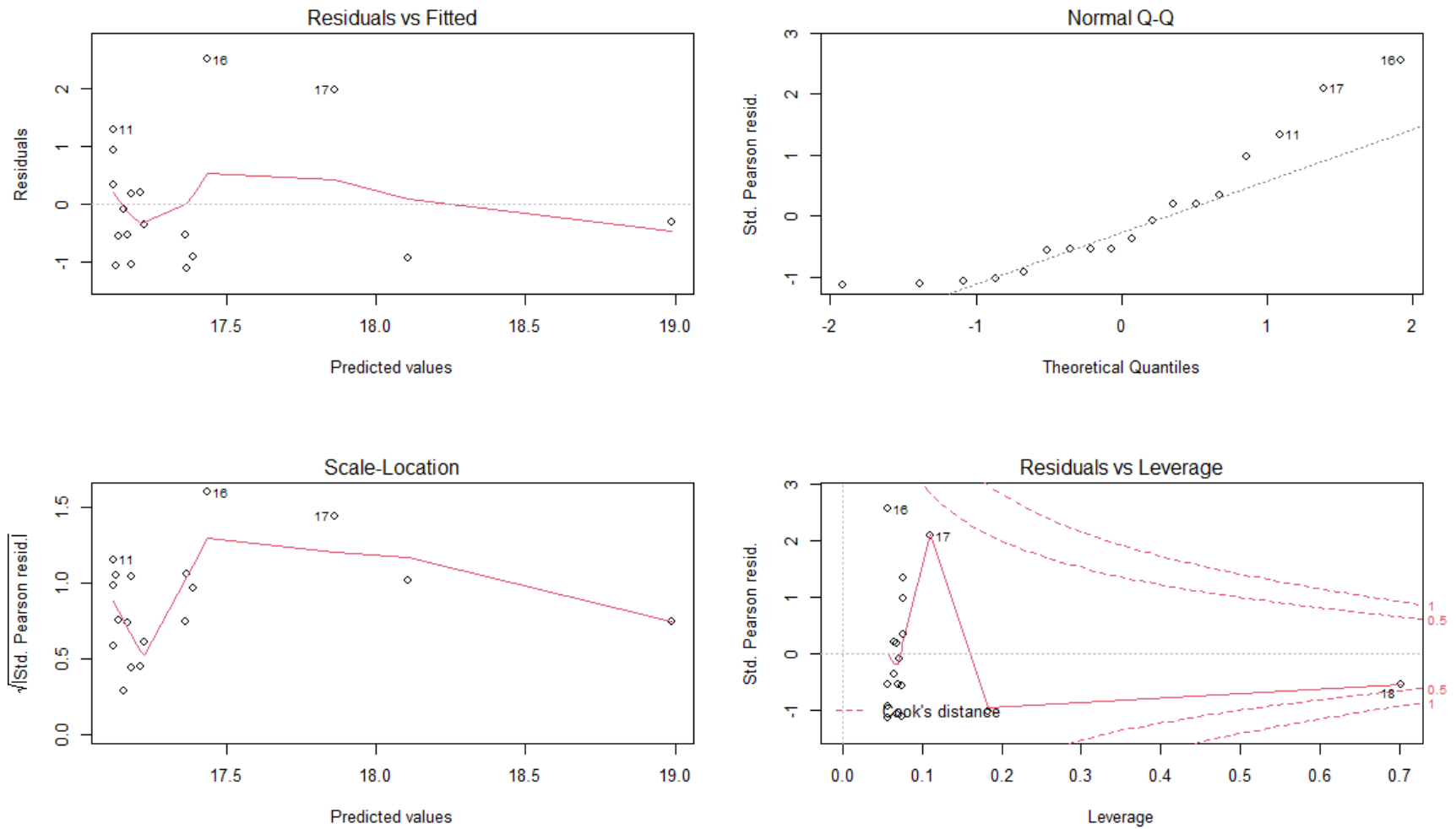


Figure S3. Generalized linear model (negative binomial with a log link) diagnostic plots for recruitment signals of age-3 abundance using October age-1 abundance (mean catch·haul⁻¹)