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Revised of standardized CPUE for North Pacific albacore caught by the Japanese pole and line data from 1972 to 2015[1]

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Summary

We revised (recaluculated) standardized CPUE (relative abundance index) for NPALB caught by JPN DWPL in new definition area because the index for us having submitted to the previous data preparation meeting was calculated using all JPN DWPL data across JPN LL Areas 1, 2, and 3 although the majority of JPN DWPL's effort and catch occurs in the Area 3.

Introduction

At the previous data preparation meeting in Nanaimo, the WG noted that the majority of JPN DWPL's effort and catch occurs in the area corresponding to JPN LL area 3, with some in Area 1 and very little south of 30°N (Area 2). The data to standardize CPUE, however, were across Areas 1, 2, and 3. The WG recommended using data from Area 3 only to simplify, therefore, we calculated JPN DWPL index again.

Data and Methods

Fisheries Data and CPUE standardization

Data for recalculation was extracted from the dataset in the previous study (Kinoshita et al. 2016). The method of CPUE standardizing was delta-lognormal model (Lo et al. 1992) and standard error for delta-lognormal model was derived from the method described by Shono (2008), which is the same as the previous study.

Results and Discussion

Figure 1 shows new and old definition area. Revised CPUE in new definition area is almost same as the index in the previous definition area (**Figure 2**). Therefore, we concluded that the effect of area change is probably nothing and recommend this new index for 2017 NPALB stock assessment.

Reference

Kinoshita, J., Ochi, D. and Kiyofuji, H. (2016) Update standardized CPUE for North Pacific albacore caught by the Japanese pole and line data from 1972 to 2015. ISC/16/ALBWG-02/04.

Lo, N. C.-h., Jacobson, L. D. and Squire, J. L. (1992) Indices of relative abundance from fish spotter data based on Delta-Lognormal Models. Can. J. Fish. Aquat. Sci., 49: 2515-2526.

Shono, H. (2008) Confidence interval estimation of CPUE year trend in delta-type two-step model. Fish. Sci., 74: 712-717.

Table 1. Comparison between this study and previous study (Kinoshita et al. 2016)

	previous study	this study
Period (whole)	1972–2015	1972–2015
Region	see Figure 1	see Figure 1
Model	delta-lognormal	same as previous study
Variables	year, qtr, latlong, vessel ID	year, latlong, vessel ID (qtr was used only 2nd in 1972-1989 and 2nd-3rd combined in 1990-2015)
Vessel ID	(Kinoshita et al. 2016)	same as previous study (no update)

Table 2. Definition of explanatory variables included in the model

Variable	Data type	Description
year	Categorical	unique year (1972–2015)
latlong	Categorical	5°× 5°
vessel ID	Categorical	unique vessel identification

Table 3. ANOVA for 1st step (a) and TYPE III ANOVA for 2nd step (b) in the period 1972–1989.

(a) 1st step

Variable	*df*	Chisq (χ^2)	*p* (> Chi)
year	17	1564.593	< 2.2e-16 ***
latlong	18	1926.637	< 2.2e-16 ***
Vessel ID	208	2535.071	< 2.2e-16 ***

(b) 2nd step

Variable	TYPE III SS	*df*	*F*	*p* (> *F*)
year	1746.867	17	87.681	< 2.2e-16 ***
latlong	1201.934	17	60.329	< 2.2e-16 ***
Vessel ID	1329.135	207	5.479	< 2.2e-16 ***

Table 4. ANOVA for 1st step (a) and TYPE III ANOVA for 2nd step (b) in the period 1990–2015.

(a) 1st step

Variable	*df*	Chisq (χ^2)	*p* (> Chi)
year	25	7403.170	< 2.2e-16 ***
latlong	23	3943.664	< 2.2e-16 ***
Vessel ID	81	907.850	< 2.2e-16 ***

(b) 2nd step

Variable	TYPE III SS	*df*	*F*	*p* (> *F*)
year	2220.142	25	84.205	< 2.2e-16 ***
latlong	804.177	22	34.660	< 2.2e-16 ***
Vessel ID	595.417	80	7.057	< 2.2e-16 ***

Table 5. Abundance indices for NPALB caught by the JPN DWPL

Year	qtr	non-zero rate		positive catch			Relative	by Shono (2008)	
		estimate	SE	estimate	SE	adjusted	abundance Index	σ[CPUE]	σ[logCPUE]
1972	2	0.695	0.068	0.165	0.052	0.165	1.038	0.006	0.299
1973	2	0.809	0.070	0.129	0.045	0.130	0.948	0.004	0.369
1974	2	0.782	0.070	0.196	0.045	0.197	1.390	0.007	0.351
1975	2	0.727	0.068	0.159	0.045	0.159	1.047	0.005	0.317
1976	2	0.734	0.068	0.170	0.044	0.170	1.127	0.006	0.322
1977	2	0.614	0.063	0.094	0.045	0.094	0.520	0.003	0.252
1978	2	0.728	0.068	0.108	0.044	0.108	0.709	0.004	0.318
1979	2	0.687	0.067	0.113	0.045	0.113	0.701	0.004	0.294
1980	2	0.648	0.065	0.165	0.046	0.165	0.967	0.006	0.271
1981	2	0.690	0.067	0.111	0.049	0.111	0.691	0.004	0.296
1982	2	0.659	0.066	0.161	0.051	0.161	0.961	0.006	0.279
1983	2	0.750	0.069	0.160	0.049	0.161	1.089	0.006	0.332
1984	2	0.767	0.069	0.199	0.047	0.200	1.386	0.007	0.343
1985	2	0.772	0.070	0.187	0.051	0.187	1.308	0.007	0.346
1986	2	0.803	0.071	0.144	0.053	0.144	1.046	0.006	0.366
1987	2	0.749	0.070	0.184	0.055	0.184	1.245	0.007	0.332
1988	2	0.570	0.066	0.137	0.097	0.138	0.710	0.009	0.245
1989	2	0.709	0.070	0.174	0.066	0.174	1.118	0.008	0.311
1990	2-3	0.291	0.031	0.241	0.053	0.241	0.631	0.008	0.110
1991	2-3	0.166	0.024	0.345	0.078	0.346	0.518	0.015	0.093
1992	2-3	0.195	0.026	0.418	0.077	0.419	0.733	0.018	0.098
1993	2-3	0.265	0.030	0.353	0.059	0.353	0.841	0.012	0.104
1994	2-3	0.501	0.036	0.403	0.042	0.403	1.817	0.011	0.194
1995	2-3	0.419	0.035	0.386	0.044	0.387	1.458	0.011	0.157
1996	2-3	0.535	0.036	0.261	0.042	0.261	1.257	0.007	0.211
1997	2-3	0.582	0.034	0.229	0.037	0.229	1.197	0.006	0.234
1998	2-3	0.549	0.035	0.248	0.042	0.248	1.223	0.007	0.218
1999	2-3	0.548	0.035	0.383	0.036	0.384	1.891	0.009	0.216
2000	2-3	0.544	0.035	0.176	0.037	0.176	0.861	0.004	0.214
2001	2-3	0.640	0.032	0.192	0.035	0.192	1.103	0.005	0.265
2002	2-3	0.711	0.029	0.326	0.035	0.326	2.086	0.008	0.306
2003	2-3	0.568	0.035	0.258	0.038	0.259	1.322	0.007	0.227
2004	2-3	0.479	0.035	0.237	0.039	0.237	1.022	0.006	0.183
2005	2-3	0.393	0.034	0.160	0.038	0.160	0.565	0.004	0.144
2006	2-3	0.302	0.031	0.167	0.049	0.167	0.454	0.005	0.111
2007	2-3	0.384	0.034	0.209	0.044	0.209	0.721	0.006	0.142
2008	2-3	0.259	0.029	0.160	0.051	0.160	0.373	0.005	0.098
2009	2-3	0.333	0.033	0.368	0.048	0.369	1.103	0.011	0.122
2010	2-3	0.404	0.034	0.244	0.043	0.244	0.885	0.007	0.150
2011	2-3	0.299	0.031	0.321	0.049	0.321	0.864	0.009	0.110
2012	2-3	0.506	0.036	0.229	0.040	0.229	1.042	0.006	0.196
2013	2-3	0.395	0.034	0.249	0.043	0.250	0.887	0.007	0.146
2014	2-3	0.400	0.035	0.233	0.046	0.233	0.836	0.007	0.149
2015	2-3	0.242	0.028	0.143	0.052	0.143	0.311	0.004	0.093

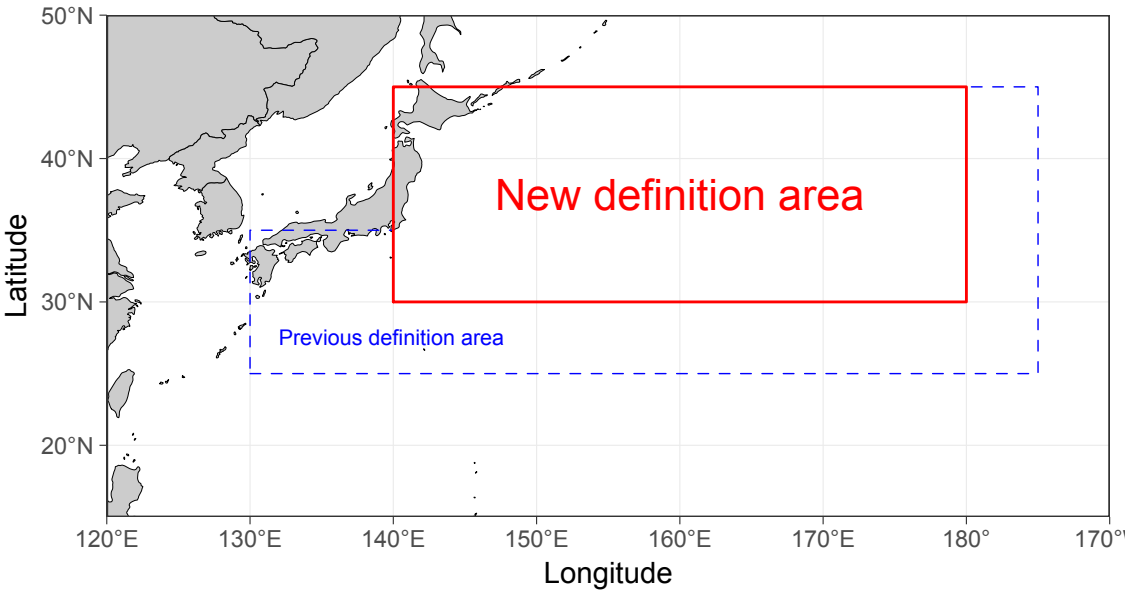

Figure 1. New definition area (equal to JPNLL Area 3) to estimate standardized CPUE for north pacific albacore (NPALB) caught by the Japanese distant water pole and line (JPN DWPL).

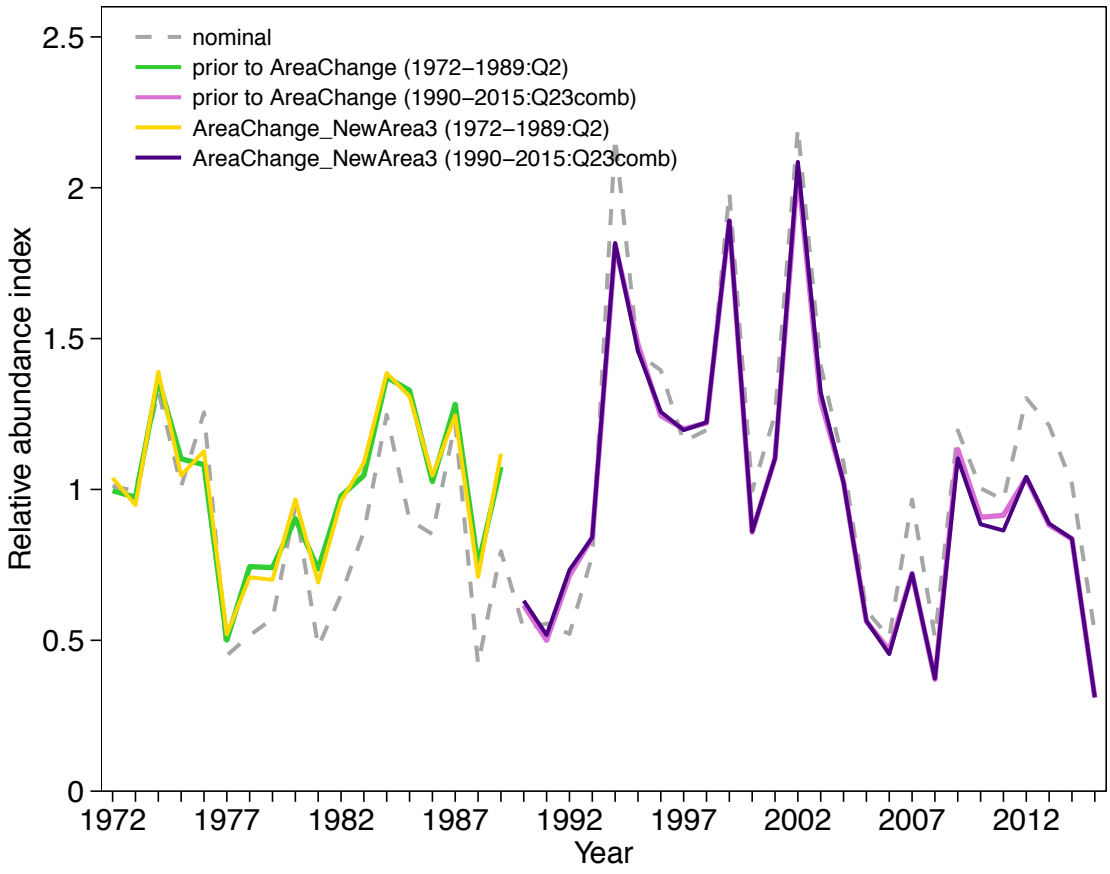

Figure 2. Standardized CPUE in new definition area (Yellow and Dark purple lines) compared to that of previous definition area (Green and Light purple lines).