Documentation for the Charterboat catch rate series

Originally presented by G. P. Scott and J.K. Lacey
SB-III-19
1996

Shark Bowl III WORKING DOCUMENT

SBIII 19

UPDATED CHARTERBOAT CATCH RATE INFORMATION FOR SHARKS THROUGH 1995

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May 1996

Data collected under a charterboat survey managed by the SEFSC Panama City laboratory were examined for use in developing standardized catch rate indices for sharks. Effort (directed at sharks) and associated catch of sharks was cross-classified by year, month, fishing area, and method of fishing (troll or not troll). Catch rate (sharks per hr fishing) was standardized for these effects through the General Linear Modelling approach, using the method of Lo et. al. (1992).

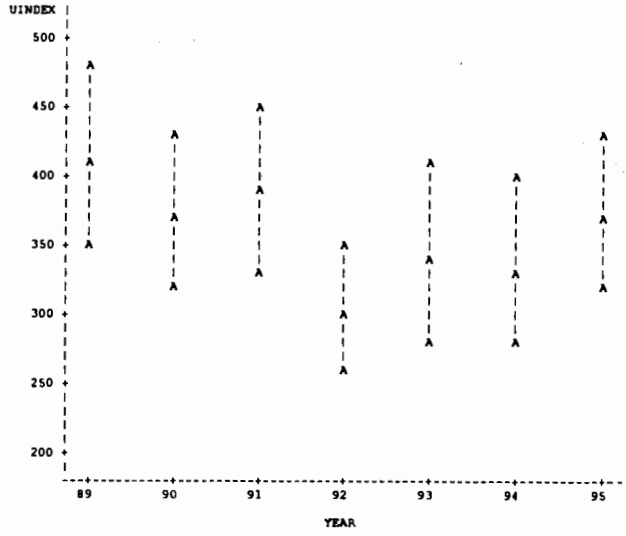
Updated data for 1995 are summarized and results of these calculations are presented in the attached tables and figures.

Table 1. Standardized Index values from the Charterboat survey data. The column "INDEX" is the bias-corrected index value. The column CV_I is the coefficient of variation for the index.

Compute Index Values using Lo Method

YEAR	CPUE	PPOS	BC_CPU	GC	BC_POS	GP	INDEX	SE_I	CV_I
89	371.525	0.73261	537.579	1.45209	0.76535	1.01914	411.439	51.4412	0.12503
90	379.609	0.64524	547.775	1.45054	0.67606	1.01905	370.328	44.9068	0.12126
91	414.298	0.61810	598.160	1.45094	0.64852	1.01900	387.918	45.8249	0.11813
92	345.869	0.57298	498.862	1.45021	0.60248	1.01906	300.555	37.5229	0.12485
93	370.526	0.60961	531.020	1.44558	0.63909	1.01884	339.372	53.0163	0.15622
94	327.645	0.67853	469.875	1.44606	0.70926	1.01884	333.262	50.5676	0.15174
95	390.831	0.62939	563.842	1.45037	0.65995	1.01906	372.106	45.4632	0.12218

Figure 1 Compute Index Values using Lo Method
Index with 80% CI



GLM on proportion positives, Charter data

General Linear Models Procedure
Class Level Information

Class	Levels	Values
YEAR	7	89 90 91 92 93 94 95
AREA	15	AL EF GA LA MS NC NEF NTX NWF SC SEF SF STX SWF WF
WAVE	6	1 2 3 4 5 6
METHOD	2	TROL NOTROL

Dependent Variable: POS

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	35	16.81939689	0.48055420	12.52	0.0001
Error	426	16.34709662	0.03837347		
Corrected Total	461	33.16649351			

R-Square	C.V.	Root MSE	POS Mean
0.507120	35.71795	0.1958915	0.5484398

Source	DF	Type III SS	Mean Square	F Value	Pr > F
YEAR	6	0.41235656	0.06872609	1.79	0.0994
AREA	14	3.87532355	0.27680882	7.21	0.0001
METHOD	1	5.13428955	5.13428955	133.80	0.0001
AREA*METHOD	14	12.30627919	0.87901994	22.91	0.0001

Parameter		Estimate	T for H0: Parameter=0	Pr > |T|	Std Error of Estimate
INTERCEPT		0.682882368 B	11.90	0.0001	0.05739939
YEAR	89	0.061492934 B	1.91	0.0567	0.03217957
	90	0.009668116 B	0.28	0.7766	0.03404500
	91	-0.006930350 B	-0.21	0.8349	0.03322653
	92	-0.035234207 B	-1.04	0.2991	0.03389226
	93	-0.012427033 B	-0.32	0.7468	0.03846891
	94	0.029493683 B	0.74	0.4574	0.03965180
	95	0.000000000 B	.	.	.
AREA	AL	0.017746734 B	0.23	0.8168	0.07655735
	EF	-0.106042819 B	-0.95	0.3449	0.11213923
	GA	0.000551515 B	0.01	0.9939	0.07187855
	LA	0.001109688 B	0.02	0.9876	0.07117841
	MS	-0.077129355 B	-1.03	0.3041	0.07496783
	NC	-0.012486314 B	-0.18	0.8594	0.07043595
	NEF	-0.014324383 B	-0.20	0.8416	0.07164380
	NTX	0.006399137 B	0.08	0.9377	0.08182320
	NWF	-0.005127207 B	-0.08	0.9365	0.06435396
	SC	-0.045392903 B	-0.72	0.4728	0.06317560
	SEF	-0.497172533 B	-7.69	0.0001	0.06468262
	SF	-0.116925015 B	-1.67	0.0959	0.07006030
	STX	-0.184615064 B	-2.49	0.0131	0.07408221
	SWF	-0.014260559 B	-0.18	0.8537	0.07730048
	WF	0.000000000 B	.	.	.
METHOD	TROL	-0.684954519 B	-6.70	0.0001	0.10220654
	NOTROL	0.000000000 B	.	.	.
AREA*METHOD	AL TROL	-0.016168268 B	-0.11	0.9088	0.14105961
	AL NOTROL	0.000000000 B	.	.	.
	EF TROL	0.503622255 B	3.09	0.0021	0.16282069
	EF NOTROL	0.000000000 B	.	.	.
	GA TROL	0.033109011 B	0.26	0.7957	0.12781685
	GA NOTROL	0.000000000 B	.	.	.
	LA TROL	0.377448816 B	3.00	0.0029	0.12602511
	LA NOTROL	0.000000000 B	.	.	.
	MS TROL	0.766282412 B	6.19	0.0001	0.12372377
	MS NOTROL	0.000000000 B	.	.	.
	NC TROL	0.483818287 B	4.03	0.0001	0.12007094
	NC NOTROL	0.000000000 B	.	.	.
	NEF TROL	0.351607494 B	2.85	0.0047	0.12357629
	NEF NOTROL	0.000000000 B	.	.	.
	NTX TROL	0.344494911 B	2.53	0.0118	0.13615601
	NTX NOTROL	0.000000000 B	.	.	.
	NWF TROL	0.518192589 B	4.33	0.0001	0.11978811
	NWF NOTROL	0.000000000 B	.	.	.
	SC TROL	0.640110746 B	5.58	0.0001	0.11477500
	SC NOTROL	0.000000000 B	.	.	.
	SEF TROL	1.165037818 B	10.22	0.0001	0.11397868
	SEF NOTROL	0.000000000 B	.	.	.
	SF TROL	0.684375276 B	5.45	0.0001	0.12560823
	SF NOTROL	0.000000000 B	.	.	.
	STX TROL	0.713508903 B	5.64	0.0001	0.12656807
	STX NOTROL	0.000000000 B	.	.	.
	SWF TROL	-0.045160224 B	-0.28	0.7825	0.16345727
	SWF NOTROL	0.000000000 B	.	.	.
	WF TROL	0.000000000 B	.	.	.
	WF NOTROL	0.000000000 B	.	.	.

NOTE: The X'X matrix has been found to be singular and a generalized inverse was used to solve the normal equations. Estimates followed by the letter 'B' are biased, and are not unique estimators of the parameters.

GLM on positive catches, Charter data

Dependent Variable: LCPUE

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	21	144.77403964	6.89400189	9.13	0.0001
Error	525	396.27773077	0.75481473		
Corrected Total	546	541.05177041			

R-Square	C.V.	Root MSE	LCPUE Mean
0.267579	14.31281	0.8688007	6.0700916

Source	DF	Type III SS	Mean Square	F Value	Pr > F
YEAR	6	2.40085106	0.40014184	0.53	0.7855
AREA	14	57.05683849	4.07548846	5.40	0.0001
METHOD	1	77.69583229	77.69583229	102.93	0.0001

Parameter		Estimate	T for H0: Parameter=0	Pr > |T|	Std Error of Estimate
INTERCEPT		5.724344788 B	25.12	0.0001	0.22791057
YEAR	89	-0.048882175 B	-0.38	0.7040	0.12859439
	90	-0.029021382 B	-0.21	0.8363	0.14039183
	91	0.058697339 B	0.42	0.6725	0.13878707
	92	-0.122329239 B	-0.87	0.3858	0.14092633
	93	-0.056665065 B	-0.36	0.7174	0.15647563
	94	-0.179327784 B	-1.15	0.2523	0.15646828
	95	0.000000000 B	.	.	.
AREA	AL	0.293300336 B	0.96	0.3353	0.30412982
	EF	1.039132172 B	2.89	0.0040	0.35970531
	GA	0.940932065 B	3.52	0.0005	0.26753972
	LA	0.920018631 B	3.64	0.0003	0.25275795
	MS	0.896561681 B	3.53	0.0005	0.25397955
	NC	0.776620947 B	3.16	0.0016	0.24540685
	NEF	1.056990143 B	4.06	0.0001	0.26051143
	NTX	0.690847700 B	2.43	0.0155	0.28452785
	NWF	0.339129599 B	1.44	0.1512	0.23593408
	SC	1.167121929 B	5.01	0.0001	0.23308359
	SEF	0.810905534 B	3.29	0.0011	0.24627096
	SF	0.126159335 B	0.49	0.6246	0.25762993
	STX	0.645692438 B	2.45	0.0146	0.26355013
	SWF	0.467561166 B	1.63	0.1039	0.28697397
	WF	0.000000000 B	.	.	.
METHOD	TROL	-0.878915054 B	-10.15	0.0001	0.08662998
	NOTROL	0.000000000 B	.	.	.

NOTE: The X'X matrix has been found to be singular and a generalized inverse was used to solve the normal equations. Estimates followed by the letter 'B' are biased, and are not unique estimators of the parameters.

Correlation Analysis

2 'VAR' Variables: PPOS CPUE

Simple Statistics

Variable	N	Mean	Std Dev	Median	Minimum	Maximum
PPOS	7	0.64092	0.05178	0.62939	0.57298	0.73261
CPUE	7	371.47193	28.43771	371.52472	327.64532	414.29792

Kendall Tau b Correlation Coefficients / Prob > |R| under Ho: Rho=0 / N = 7

	PPOS	CPUE
PPOS	1.00000	-0.04762
	0.0	0.8806

SB-III-19