

# Evaluation of Abundance Indices:

## Index Title (Working Paper #)

### DESCRIPTION OF THE DATA SOURCE

#### 1. Fishery Independent Indices

- A. Describe the survey design (e.g. fixed sampling sites, random stratified sampling), location, seasons/months and years of sampling.
- B. Describe sampling methodology (e.g. gear, vessel, soak time etc.)
- C. Describe any changes in sampling methodology (e.g. gear, vessel, sample design etc.)
- D. Describe the variables reported in the data set (e.g. location, time, temperature, catch, effort etc.).
- E. What species or species assemblages are targeted by this survey (e.g. red snapper, reef fish, pelagic).
- F. Describe the size/age range that the index applies to. Include supporting figures (e.g. size comp) if available.

	Not Applicable	Absent	Incomplete	Complete

#### 2. Fishery Dependent Indices

- A. Describe the data source and type of fishery (e.g. commercial handline, commercial longline, recreational hook and line etc.).
- B. Describe any changes to reporting requirements, variables reported, etc.
- C. Describe the variables reported in the data set (e.g. location, time, temperature, catch, effort etc.).
- D. Describe the size/age range that the index applies to. Include supporting figures (e.g. size comp) if available.


### METHODS

#### 1. Data Reduction and Exclusions

- A. Describe any data exclusions (e.g. gears, fishing modes, sampling areas etc.). Report the number of records removed and justify removal.
- B. Describe data reduction techniques (if any) used to address targeting (e.g. Stephens and MacCall, 2004; gear configuration, species assemblage etc).
- C. Discuss procedures used to identify outliers. How many were identified? Were they excluded?


### Working Group Comments:

2. Management Regulations (for FD Indices)

- A. Provide (or cite) history of management regulations (e.g. bag limits, size limits, trip limits, closures etc.).
- B. Describe the effects (if any) of management regulations on CPUE
- C. Discuss methods used (if any) to minimize the effects of management measures on the CPUE series.

	Not Applicable	Absent	Incomplete	Complete

3. Describe Analysis Dataset (after exclusions and other treatments)

- A. Provide tables and/or figures of number of observations by factors (including year, area, etc.) and interaction terms.
- B. Include tables and/or figures of number of positive observations by factors and interaction terms.
- C. Include tables and/or figures of the proportion positive observations by factors and interaction terms.
- D. Include tables and/or figures of average (unstandardized) CPUE by factors and interaction terms.
- E. Include annual maps of locations of survey sites (or fishing trips) and associated catch rates **OR** supply the raw data needed to construct these maps (Observation, Year, Latitude, Longitude (or statistical grid, area), Catch, Effort).
- F. Describe the effort variable and the units. If more than one effort variable is present in the dataset, justify selection.
- G. What are the units of catch (e.g. numbers or biomass, whole weight, gutted weight, kilograms, pounds).


4. Model Standardization

- A. Describe model structure (e.g. delta-lognormal)
- B. Describe construction of GLM components (e.g. forward selection from null etc.)
- C. Describe inclusion criteria for factors and interactions terms.
- D. Were YEAR\*FACTOR interactions included in the model? If so, how (e.g. fixed effect, random effect)? Were random effects tested for significance using a likelihood ratio test?
- E. Provide a table summarizing the construction of the GLM components.
- F. Summarize model statistics of the mixed model formulation(s) (e.g. log likelihood, AIC, BIC etc.)
- G. Report convergence statistics.


**Working Group  
Comments:**

**MODEL DIAGNOSTICS**

*Comment: Other model structures are possible and acceptable. Please provide appropriate diagnostics to the CPUE indices working group.*

**1. Binomial Component**

- A. Include plots of the chi-square residuals by factor.
- B. Include plots of predicted and observed proportion of positive trips by year and factor (e.g. year\*area)
- C. Report overdispersion parameter and other fit statistics (e.g. chi-square / degrees of freedom).

	Not Applicable	Absent	Incomplete	Complete

**2. Lognormal/Gamma Component**

- A. Include histogram of log(CPUE) or a histogram of the residuals of the model on CPUE. Overlay the expected distribution.
- B. Include plots describing error distribution (e.g. Studentized residuals vs. linear predictor).
- C. Include QQ-plot – (e.g. Student deviance residuals vs. theoretical quantiles), Overlay expected distribution.
- D. Include diagnostic plot for variance function (e.g. square root of std residuals vs. fitted values). Overlay expected distribution.
- E. Include diagnostic plot for link function (e.g. linear response variable vs. linear predictor). Overlay expected distribution.
- F. Include plots of the residuals by factor


**3. Poisson Component**

- A. Report overdispersion parameter and other fit statistics (e.g. chi-square / degrees of freedom).
- B. Include plots describing error distribution (e.g. Studentized residuals vs. linear predictor).
- C. Include QQ-plot – (e.g. Student deviance residuals vs. theoretical quantiles), Overlay expected distribution.
- D. Include diagnostic plot for variance function (e.g. square root of std residuals vs. fitted values). Overlay expected distribution.
- E. Include diagnostic plot for link function (e.g. linear response variable vs. linear predictor). Overlay expected distribution.


**4. Zero-inflated model**

- A. Include ROC curve to quantify goodness of fit.
- B. Include plots describing error distribution (e.g. Studentized residuals vs. linear predictor).
- C. Include QQ-plot (e.g. Student dev. residuals vs. theoretical quantiles), Overlay expected distribution.


**Working Group Comments:**

*The feasibility of this diagnostic is still under review.*

**MODEL DIAGNOSTICS (CONT.)**

	Not Applicable	Absent	Incomplete	Complete
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**Working Group Comments:**

D. Include diagnostic plot for variance function (e.g. square root of std residuals vs. fitted values). Overlay expected distribution.

E. Include diagnostic plot for link function (e.g. linear response variable vs. linear predictor). Overlay expected distribution.


## MODEL RESULTS

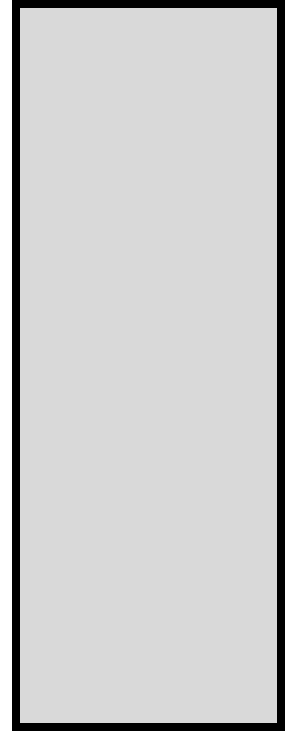
A. Tables of Nominal CPUE, Standardized CPUE, Observations, Positive Observations, Proportion Positive Observations and Coefficients of Variation (CVs). Other statistics may also be appropriate to report

B. Figure of Nominal and Standardized Indices with measure of variance (i.e. CVs).


## IF MULTIPLE MODEL STRUCTURES WERE CONSIDERED:

*(Note: this is always recommended but required when model diagnostics are poor.)*

1. Plot of resulting indices and estimates of variance
2. Table of model statistics (e.g. AIC criteria)

	<i>Date Received</i>	<i>Workshop Recommendation</i>	<i>Revision Deadline ***</i>	<i>Author and Rapporteur Signatures</i>
<b>First Submission</b>				
<b>Revision</b>				

*The revision deadline is negotiated by the author, the SEDAR coordinator and the CPUE rapporteur. The author **DOES NOT** commit to any **LEGAL OBLIGATION** by agreeing to submit a manuscript before this deadline. The maximum penalty for failure to submit a revised document prior to the submission deadline is rejection of the CPUE series.*

***Justification of Working Group Recommendation***