

**Project:** Age structure of bluenose

**Project Code:** BNS2008/01

**Start Date:** 1 December 2008

**Completion Date:** 30 October 2009

**Vessel Use:** None

**Note:** This project has, as per the recommendation of the Southern Inshore Working Group replaced the previous title - Relative abundance of BNS 1, 2, 3, 7, and 8.

**Overall Objectives:**

1. To determine the stock status of bluenose (*Hyperoglyphe antarctica*) by investigating the spatial and temporal age structure of the New Zealand bluenose commercial catches.

**Specific Objectives:**

1. To design a sampling programme to investigate age structure in the bluenose commercial catches, using existing otolith collections held by SeaFIC and MFish.
2. To investigate stock structure by determining the age structure of the bluenose catches across areas.
3. To assess fishing mortality rates by comparing the age structure of bluenose catches over time.

**Reporting Requirements:**

**Research Reporting**

Objectives 1 to 3

1. To present the sampling design and methodology to the Southern Inshore Fishery Assessment Working Group for approval in early 2009 prior to commencing the aging work.
2. To present preliminary results to the Southern Inshore Fishery Assessment Working Group in August-September 2009 in Wellington or Auckland. Presentations to more than one meeting may be required.
3. To submit to the Chief Scientist, MFish a draft revised Working Group Report as specified in Research Reporting form 8 for bluenose by 1 May 2010.
4. To submit to the Chief Scientist MFish a Final Research Report as specified in Research Reporting form 5 or a draft Fishery Assessment Report as specified in Research Reporting form 7 by 1 September 2009.

## **Project Update Reports**

No Project Update Reporting is required for this project.

## **Work In Progress Reports**

Monthly Work In Progress Reporting is required for this project in accordance with the Conducting Research with the Ministry document.

## **Data Reporting**

To submit any data generated, collected or modified during the course of this project to the Research Data Manager, MFish by 31 October 2009.

## **Rationale:**

The results from the 2008 AMP Working Group suggest that the CPUE indices from many bluenose fisheries appear to reflect changes in abundance and there is an urgent need to ground truth the apparent decline in abundance suggested by the CPUE indices. Therefore, the pilot survey originally proposed in project BNS2008/01 to produce a fishery independent index has been postponed by a year. The new objectives in this project are proposed to determine if evidence of the large declines in abundance seen in CPUE can also be seen in the age structure of commercial catch. There are a large number of otoliths available from existing SeaFIC and MFish collections and they will be aged to assess mortality over time.

The various commercial logbook sampling programmes that have operated under some of the BNS AMPs have collected over 12,000 otoliths since 1994/95, particularly in BNS 1. In addition to this, otoliths have been collected from BNS from several shed sampling programmes. Ageing validation studies have confirmed that BNS can be reliably aged using otoliths, and indicated that BNS are substantially longer lived than previously thought, attaining a maximum age of up to 60 years.

Although CPUE has previously not been considered to be a reliable indicator of abundance of BNS stocks, close coincidence observed in declining CPUE trends in most BNS stocks in recent years has increased confidence in their value as indices of abundance for some component (at least) of the BNS stocks in each QMA. Standardised CPUE series, based on data from six fisheries which span most of major fisheries taking BNS in the NZ EEZ, have declined an average of 64% over the period 2001/02 to 2006/07.

The AMP Working Group noted that localised depletion of slow-growing adults that have accumulated on preferred seabed features could have occurred. The Working Group emphasized the importance of obtaining spatially and temporally representative size- and age-frequency information for all the major BNS fisheries.

This project will conduct age determinations on an appropriate subset of the otoliths, selected to be representative of spatial (area and depth) and time strata appropriate for stock assessments. Otoliths to be read should be selected to represent areas or

features fished consistently over time, to provide comparative Z estimates for these fisheries. Commercial stakeholder organizations will need to be consulted with regard to the availability of data and samples for conducting this ageing work.

### *Objective 1*

This objective is to catalogue the otolith samples held by SeaFIC and MFish to identify the samples that are spatially (area and depth) and temporally consistent and collected by the same type of fishing gear. This description will enable the selection of the most appropriate fish to age for the analyses, using the same otoliths for objectives 2 and 3 where possible. The selection criteria used will be presented to the Southern Inshore Working Group for approval prior to the commencement of the work and should demonstrate from which years and areas the aged otoliths were selected. Note the otoliths collections need to be assessed to determine if the samples that are being analysed are reflective of the fishery or the population, this will involve some fishery characterisation work.

### *Objectives 2 and 3*

These two objectives will explore the age structure of the BNS 1 population. Information on the spatial and temporal mortality of these populations will be required. It is important to note that the spatial scale of this work should be feature specific and not by fishery area.

A change to the age structure of this catch through time is one potential source of information on the status of exploited fish stocks. Under these objectives the successful tenderer provide:

- Estimates of total fishing mortality that incorporate uncertainty in key parameters (e.g. age-at-full recruitment and other selectivity issues) and the different properties of regression and Chapman-Robson estimators.
- Comparison of the age / size composition of the catch to the age / size-at-maturity
- Discussion of the consistency of signals over time, e.g. is the progression of cohorts apparent and are estimates of Z stable between adjacent years.

This information will be used to inform discussions on the most appropriate approaches for the wider age structure investigations using existing otolith collections, the longer term monitoring of these stocks and the likely frequency of catch sampling.

### *Weighting of Objectives:*

Weightings indicate the relative importance of each of the objectives. The weightings for the objectives in this project are (in order): 0.2, 0.4 and 0.4.

**Project:** Approaches for determining in season TAC increases for 2<sup>nd</sup> Schedule stocks

**Project Code:** INS2008/02

**Start Date:** 1 December 2008

**Completion Date:** 31 December 2009

**Vessel Use:** None

**Overall Objectives:**

1. To examine approaches for managing Second Schedule stocks.

**Specific Objectives:**

1. To examine approaches for determining in-season TAC increases in FLA and RCO stocks.

**Reporting Requirements:**

**Research Reporting**

Objective 1

1. To present the results to meetings of the Inshore Fishery Assessment Working Group in June-July 2009 in Wellington. Presentations to more than one meeting may be required.
2. To submit to the Chief Scientist MFish a Final Research Report as specified in Research Reporting form 5 or a draft Fishery Assessment Report as specified in Research Reporting form 7 by 31 December 2009.

**Project Update Reports**

No Project Update Reporting is required for this project.

**Work In Progress Reports**

Monthly Work In Progress Reporting is required for this project in accordance with the Conducting Research with the Ministry document.

**Data Reporting**

To submit any data generated, collected or modified during the course of this project to the Research Data Manager, MFish by 31 December 2009.

**Rationale:**

FLA and RCO are included in the Second Schedule of the Fisheries Act (1996) as stocks whose abundance is highly variable. For such stocks, s13(7) of the Fisheries Act allows the Minister to implement an in-season increase to the TAC.

TACCs for all FLA stocks are well in excess of commercial landings and aside from RCO 7, TACCs have not been approached for any RCO stock since 1999/2000. Concerns regarding the sustainability of the current TACs led to reductions for RCO 7 and FLA 7 from on 1 October 2007. With these reductions it is possible that the TACC could be exceeded in good years and the TACC for RCO 7 was overcaught during the 2007/08 fishing year.

These issues highlight the need for criteria to allow for in-season increases in TACs for RCO and FLA stocks in instances where there are clear opportunities for increased utilisation while ensuring sustainability.

Presently there is no scientific basis for setting TACs and implementing in-season increases for these Second Schedule stocks. The goal of this project is to examine historical data for various RCO and FLA stocks to determine how fluctuations in abundance (in particular, increases in abundance) of these species can be predicted in sufficient time for the Minister to consult and implement an in-season increase. Ideally, such an approach, or decision rule, will also provide some guidance on the level of any increase. However, it will not be sufficient to just predict that catches could exceed the TACC without providing some information that sustainability will not be at risk.

*Objective 1*

Information to potentially inform development of a decision rule is available for FLA or RCO stocks. In addition to routine catch and effort data, data exists from trawl surveys (noting that there are some concerns regarding the utility of some of the survey series for monitoring abundance of flatfish), and environmental data may also be of use to help predict recruitment in these recruitment driven fisheries.

Due to recent catches and TAC decisions, the work should focus on FLA 3, RCO 3, and RCO 7, though it is expected that the principles of any decision rules should be easily applied to other stocks.

Any decision rules developed should indicate the opportunity for any increase and provide some guidance on the likely level of an increase. Given the time frames within which management occurs, predictions early in the fishing year are needed.

*Weightings*

The weighting for the only objective in this project is 1.0