



**NIWA**

*Taihoru Nukurangi*

**Catch sampling for length/sex of bluenose in  
BNS 2, during the 1998–99 fishing year**

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**Final Research Report for  
Ministry of Fisheries Research Project INS9801  
Objective 2**

**National Institute of Water and Atmospheric Research**

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## Final Research Report

- Report Title** Catch sampling for length/sex of bluenose in BNS 2, during the 1998–99 fishing year
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- 1. Date** 18 September 2000
  - 2. Contractor** National Institute of Water and Atmospheric Research Limited (NIWA)
  - 3. Project Title** Commercial catch sampling of alfonsino, bluenose, gemfish and rubyfish in QMA 2, and stock assessment of alfonsino and rubyfish
  - 4. Project Code** INS9801
  - 5. Project Leader** P.J. McMillan
  - 6. Duration of Project** 20 months  
Start date: 1 October 1998  
Completion date: 31 May 2000
  - 7. Executive Summary**

This report describes the length frequency distribution of bluenose derived from the sampling programme carried out on commercial landings of bluenose in QMA 2 during the 1998–99 fishing year, as part of Objective 2 of project INS9801. Further details on Objective 1 of this project (catch sampling for length and age of alfonsino and rubyfish), and Objective 2 (catch sampling for length and sex of gemfish) are provided in a separate final research report. Objectives 3 and 4 of project INS9801 are covered in separate NZ Fishery Assessment Reports.

The target sample number of 32 catches was achieved for bluenose. Target numbers of otoliths sampled (1063) achieved the planned target of 800 bluenose otoliths from BNS 2. The size frequency distribution of bluenose in BNS 2 during 1998–99 is consistent with data from previous years.

## 8. OBJECTIVES

**The objectives for project INS9801 are:**

1. To collect samples which will enable determination of the length and age structure of the commercial catch of alfonsino (*Beryx splendens*), bluenose (*Hyperoglyphe antarctica*), gemfish (*Rexea solandri*), and rubyfish (*Plagiogeneion rubiginosum*) in QMA 2.
2. To carry out a stock assessment of alfonsino (*Beryx splendens*), and rubyfish (*Plagiogeneion rubiginosum*) in QMA 2.

**Specific objectives for 1998/99 are:**

1. To conduct the sampling and determine the length and age structure of the commercial catch of alfonsino in BYX 2 and rubyfish in QMA 2 during the 1998/99 fishing year from samples collected in fish sheds. The target coefficient of variation (*c.v.*) for the catch at age is 20% (mean weighted *c.v.* across all age classes).
2. To measure lengths and collect otoliths from the commercial catch of bluenose in BNS 2 and gemfish in SKI 2 during the 1998/99 fishing year. The target coefficient of variation (*c.v.*) for the catch at age (to be derived in project SKI9801 and BNS9801) is 20% (mean weighted *c.v.* across all age classes).
3. To develop standardised CPUE indices for the midwater trawl fishery for alfonsino in BYX 2 and rubyfish in QMA 2
4. To describe the interaction between the fisheries for alfonsino, bluenose, gemfish and rubyfish.

## 9. METHODS

This report describes the scaled length frequency distribution of the commercial catch of bluenose during 1998–99. Other parts of this project have been separately reported. For Objective 1, the scaled age and length frequency distribution for alfonsino and rubyfish is provided in McMillan *et al.* (2000). For Objective 2 (gemfish), this project involved data collection, and the scaled age and length frequency for gemfish is reported in Hurst *et al.* (1999). For Objective 3, standardised CPUE indices for the 1998–99 fishing year are reported for alfonsino and for rubyfish in Blackwell (2000a) and Blackwell (2000b) respectively.

Under Objective 2 (bluenose) this project involved data collection, and the development of a scaled length frequency distribution for the 1998–99 commercial fishery. Key activities under this objective were developing the sampling strata; sampling the commercial catch; entry of validated data on the market database; estimating scaled length frequency distribution.

## 9.1 Developing sampling strata for bluenose

The vessels that fished for bluenose, or took bluenose as a bycatch, were generally the same vessels that provided samples for alfonsino, rubyfish and gemfish in the other parts of project INS9801. The sampling strata were developed as described in McMillan *et al.* (2000) for these four species. Strata were related to the expected seasonal distribution of the commercial catch, based on the most recently available complete catch data (June 1995 to May 1998). For bluenose, three vessel strata were developed. A set of high catch trawlers (T1) which accounted for around two thirds of the catch data were identified. The remaining trawl vessels were placed in a second strata (T2). For bluenose, approximately 30% of total landings were taken by target line fishing during June 1995 to May 1998 (Blackwell 1999). All other catches including line and set net methods were included in stratum OTH.

From the catch data, October to December was identified as the peak for each of these fisheries. The two factors of vessel (T1, T2, OTH) and season (Oct-Dec; Jan-Sept) were then used to define strata, where the expected catch was about the same. The target number of landings sampled was made proportional to the square of the anticipated catch in each stratum, to approximately minimise the variance of the estimated proportion at age (D. Gilbert, NIWA, *pers. com.* 1999). A minimum of three landings per stratum was set, so that estimates of variance could be made within each stratum. The strata and target number of landings to be sampled from this analysis are given in Table 1.

## 9.2 Estimating scaled catch at length for bluenose

The sampling aimed to collect 32 samples and about 800 otoliths. For each landing about 200 fish were randomly selected and measured to the nearest centimetre below fork length and sexed. Otoliths were collected randomly from up to 50 fish in each landing.

The sampled length frequency distribution by sex was scaled up from each sampling stratum to the commercial catch. Commercial catch landings data for each sampling stratum were extracted from the Ministry of Fisheries database for the 1998–99 fishing year (Table 2). For each 1 cm length class, the proportions of male and female fish in the sampled population were scaled by the size of landing, and the relative size of the stratum of the commercial catch.

## 10. RESULTS

The total of 32 samples taken overall (Table 2) follows the sample design (Table 1), and the proposed sampling regime was generally followed although industry suggestions that most of the fish would be caught early in the season resulted in sampling being completed by June. Between June and August most trawl vessels were engaged in orange roughy or hoki fishing.

A total of 5731 bluenose (Table 3) were measured in the 32 samples: 2948 males and 2783 females, providing an almost equal sex ratio (51% male). The length frequency

distribution, scaled to the landings and commercial catch, is given in Table 4 and Figure 1, where the *c.v.* 's represent the variation of the mean proportion at length over all samples. Most males were caught in the range 48–66 cm, whilst females were taken in a range from 49–69 cm. Fish smaller than 45 cm were rare.

## 11. CONCLUSIONS

The specific objectives and targets were achieved for bluenose, including number of landings sampled, and number of otoliths collected. The length frequency from the commercial catch data is generally consistent with those previously reported by Horn (1988) and Horn & Massey (1989). Fewer small bluenose were sampled than during 1997–98 (Blackwell 1999). This may reflect the lower number of samples taken from the target line fishery. During the 1998–99 fishing year, the number of line fishing vessels decreased and industry sources (T. Gittens, fish processor, Napier, *pers. comm.* 1999) indicated that this quota has be re-allocated to bluenose bycatch in the alfonsino and gemfish trawl fisheries.

## 12. ACKNOWLEDGEMENTS

The assistance of Peter Horn in extracting the catch at length data is acknowledged. The assistance of NIWA catch sampling staff in Rotorua (Eddie Bowman, Walter Hillman), Napier (Peter Arnold, Geoff Holland), Wellington (David Fisher, Kim George) and Nelson (Ralph Dixon, Rob Merrilees, Don Tindale, Mike Stevenson) is also acknowledged. Thanks too, to the fish factory staff who provided access to the catch sampling teams for this project

## 13. PUBLICATIONS

Nil.

## 14. DATA STORAGE

All data are stored on M Fish databases (*market* and *age*).

## 15. REFERENCES

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**Table 1: Sampling strata, planned and actual number of landings of bluenose in BNS 2 in 1998–99**

Vessel type Months	Stratum						Total
	T1		T2		OTH		
	Oct-Dec	Jan-Sep	Oct-Dec	Jan-Sep	Oct-Dec	Jan-Sep	
Planned landings sampled	7	9	3	4	4	5	32
Actual landings sampled	8	6	3	6	4	5	32

**Table 2: Landings of bluenose (t) in BNS 2 by sampling strata, 1998–99**

Quarter	Stratum			Total
	T1	T2	OTH	
Oct-Dec	135	15	123	273
Jan-Sept	202	135	233	570
Total	337	150	356	843

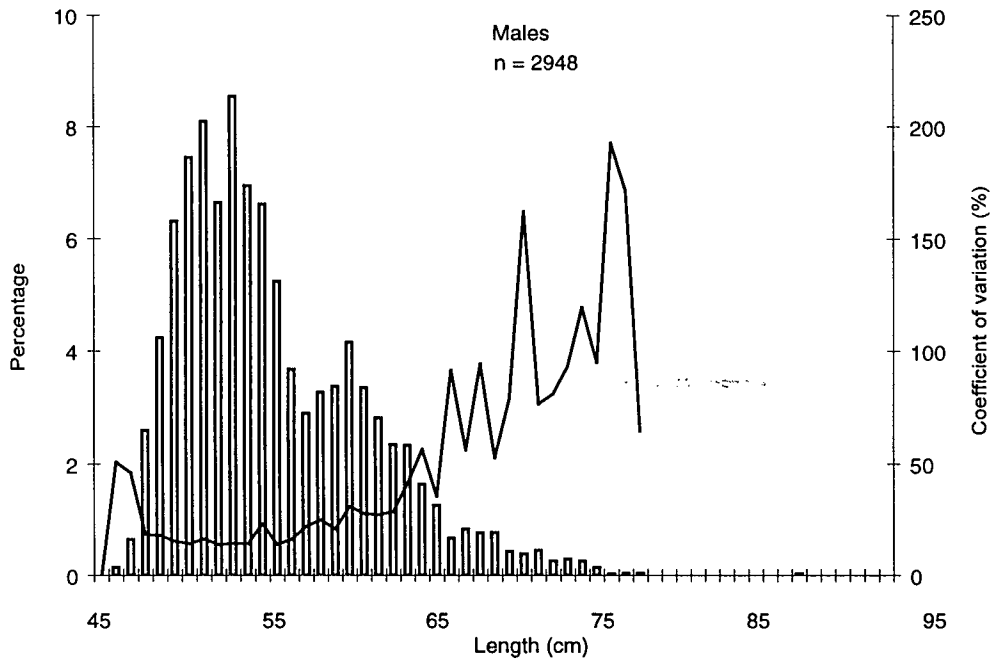
**Table 3: Numbers of male and female (*italics*) bluenose sampled in BNS 2 by sampling strata, 1998–99**

Quarter	T1		T2		OTH		Total	
	Males	<i>Females</i>	Males	<i>Females</i>	Males	<i>Females</i>	Males	<i>Females</i>
Oct-Dec	600	<i>613</i>	318	<i>309</i>	453	<i>356</i>	1371	<i>1278</i>
Jan-Sept	580	<i>629</i>	516	<i>529</i>	481	<i>347</i>	1577	<i>1505</i>
Total	1180	<i>1242</i>	834	<i>838</i>	934	<i>703</i>	2948	<i>2783</i>

**Table 4: BNS 2 sampled catch (numbers of fish) 1998–99, scaled by season and vessel strata the total reported landings. The *c.v.* represents the variation in mean proportion at length over all samples**

length (cm)	no. males	<i>c.v.</i> (%)	no. females	<i>c.v.</i> (%)
45	0	0	45	77.82
46	155	50.85	24	236.08
47	709	46.14	424	36.68
48	2833	18.69	449	44.53
49	4619	18.19	2025	24.1
50	6883	15.57	4593	15.4
51	8126	14.42	3440	24.23
52	8822	16.64	5618	21.23
53	7237	13.98	6694	14.17
54	9318	14.58	6722	16.44
55	7572	14.45	6977	13.25
56	7210	23.49	6408	13
57	5712	14.05	5830	15.01
58	4002	16.64	5769	15.83
59	3156	22.21	4834	17.76
60	3561	25.22	5069	16.82
61	3678	21.19	4998	19.68
62	4532	31.26	3660	19.14
63	3650	27.91	3160	22.96
64	3069	27.53	3499	18.49
65	2558	28.86	4121	38.3
66	2536	41.68	2464	21.05
67	1786	56.3	3327	37.05
68	1380	35.69	1219	29.14
69	739	91.53	2472	33.85
70	924	56.12	658	42.92
71	841	94.33	929	34.86
72	850	52.59	464	54.48
73	474	78.65	863	36.46
74	426	162.24	458	63.16
75	494	76.57	233	131.28
76	284	80.97	418	88.59
77	322	93.03	749	60.38
78	277	119.26	373	70.3
79	152	94.88	462	56.17
80	26	192.71	358	111.3
81	38	171.74	489	100.99
82	45	64.57	257	91.07
83	0	0	284	128.83
84	0	0	260	89.31
85	0	0	190	75.78
86	0	0	196	78.61
87	0	0	131	125.53
88	0	0	59	115.67
89	0	0	104	212
90	0	0	64	265.73
91	0	0	36	311.76
92	0	0	0	0
93	32	110.67	0	0
94	0	0	38	144.72
95	0	0	0	0





**Figure 1: Length frequency distribution (bars) and c.v. (lines) of bluenose in BNS 2 scaled to the commercial catch in the 1998-99 fishing year, by sex**

