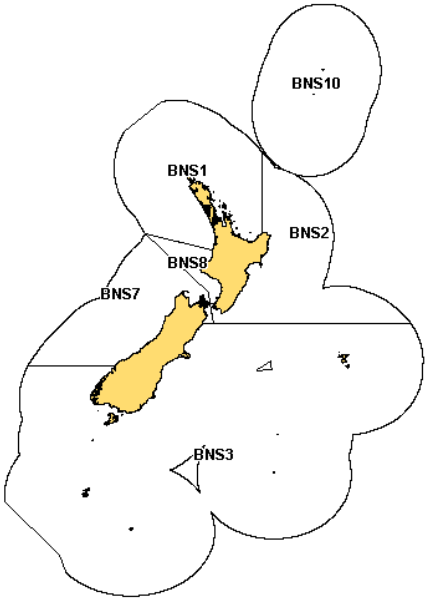
BLUENOSE (BNS)

(Hyperoglyphe antarctica)



1. FISHERY SUMMARY

(a) Commercial fisheries

The most important domestic bluenose trawl fisheries occur off the Wairarapa Coast (BNS 2), where bluenose is a major bycatch in the alfonsino and gemfish target trawl fisheries, and a lesser component in other trawl fisheries. There is substantial targeting of bluenose by the line fishery in the Bay of Plenty and off Northland (BNS 1). Line fisheries for bluenose also exist in BNS 2 north and east of East Cape and to the west of Cook Strait in BNS 7 and BNS 8. About half of the BNS 2 catch is taken by longline and the remainder by bottom trawl. There is a developing fishery for bluenose on the Chatham Rise using both trawl and line gear. About two thirds of BNS 3 landings are taken as a bycatch in the hoki bottom trawl and ling longline fisheries. Bluenose supports a small target line fishery off the Wairarapa Coast and a small amount of target setnet fishing for bluenose occurs in the Bay of Plenty and off the east and south coasts of the South Island.

Prior to 1981, bluenose were sometimes recorded as bonita or hapuku, so these landings data are inaccurate. Landings before 1986–87 were grouped by statistical area that approximates the current QMAs. Total annual bluenose landings were relatively constant at a level of about 1400 t from 1984 to 1989–90, these rose to approximately 2300 t from 1992–93 to 1995–96. Total landings from 2002-03 to 2004-05 exceeded 3000 t, but dropped to 2470 t in 2005-06.

The TACC for BNS 3 was increased under the Adaptive Management Programme (AMP) from 175 t to 350 t for the 1992–93 fishing year. This TACC was exceeded from 1994–95 to 2000–01, within the provisions of the AMP the TACC was increased to 925 t on 1 October 2001. The rise in landings was caused by the development of a bottom trawl fishery targeting alfonsino (and bluenose in 2001–02) on the Chatham Rise (QMA 4), and to an increase in bluenose bycatch in target ling line fishing near the Chatham Islands and to the development of a target dahn line fishery for bluenose in the south-western part of the South Island (SeaFIC, 2003).

The TACCs for BNS 7 and 8 were increased to 150 t and 100 t respectively for the 1994–95 fishing year under the AMP. Landings since this time have approached the new TACCs, particularly for BNS 7, although the TACCs were substantially under caught in the last five fishing seasons. The BNS

2 TACC was increased from 873 t to 1048 t under an AMP on 1 October 2004. Reported landings and TACCs are given in Table 1.

Table 1: Reported landings (t) of bluenose by Fishstock from 1981 to 2003–04 and actual TACCs (t) from 1986–87 to 2005–06.

Fishstock	BNS 1		BNS 2		BNS 3		BNS 7		BNS 8		BNS 10			
FMA (s)	1 & 9		2		3, 4, 5 & 6		7		8		10		Total	
	Landings	TACC	Landings	TACC	Landings	TACC	Landings	TACC	Landings	TACC	Landings	TACC	Landings	TACC
1981*	146		101		36		12		–		0		295	
1982*	246		170		46		22		–		0		484	
1983†	250		352		51		47		1		0		726	
1984†	464		810		81		30		1		0		1411	
1985†	432		745		73		26		1		0		1326	
1986†	440		1009		33		53		1		0		1566	
1986–87‡	286	450	953	660	93	150	71	60	1	20	7	10	1411	1 350
1987–88‡	405	528	653	661	101	166	104	62	1	22	10	10	1274	1 449
1988–89‡	480	530	692	768	90	167	135	69	13	22	10	10	1420	1 566
1989–90‡	535	632	766	833	132	174	105	94	3	22	0	10	1541	1 765
1990–91‡	696	705	812	833	184	175	72	96	5	22	12 #	10	1781	1 841
1991–92‡	765	705	919	839	240	175	62	96	5	22	40 #	10	2031	1 847
1992–93‡	787	705	1151	842	224	350	120	97	24	22	29 #	10	2335	2 026
1993–94‡	615	705	1288	849	311	350	79	97	27	22	3 #	10	2323	2 033
1994–95‡	706	705	1028	849	389	357	83	150	79	100	0	10	2286	2 171
1995–96‡	675	705	953	849	513	357	140	150	70	100	0	10	2352	2 171
1996–97‡	966	1 000	1100	873	540	357	145	150	86	100	9 #	10	2846	2 490
1997–98‡	1020	1 000	929	873	444	357	123	150	67	100	30 #	10	2613	2 490
1998–99‡	868	1 000	1002	873	729	357	128	150	46	100	2 #	10	2774	2 490
1999–00‡	860	1 000	1136	873	566	357	114	150	55	100	0 #	10	2736	2 490
2000–01‡	890	1 000	1097	873	633	357	87	150	14	100	0 #	10	2720	2 490
2001–02‡	954	1 023	1010	873	733	925	70	155	17	103	0 #	10	2787	3 089
2002–03‡	1051	1 023	933	873	876	925	76	155	66	103	0	10	3002	3 089
2003–04‡	1030	1 023	933	873	915	925	117	155	96	103	0	10	3091	3 089
2004–05‡	870	1 023	1162	1048	844	925	94	155	42	103	0	10	3012	3 264
2005–06‡	695	1 023	1136	1048	535	925	84	155	20	103	0	10	2471	3 264

* MAF data.
† FSU data.
‡ QMS data.
\# Includes exploratory catches in excess of the TAC.

(b) Recreational fisheries

The annual recreational catch of BNS 1 was estimated from diary surveys to be 2000 fish in 1993–94 (Teirney et al., 1997), 5000 fish in 1996 (Bradford, 1998) and 11 000 fish in 1999/2000 (Boyd & Reilly, 2005). Owing to biases inherent to telephone vs. face-to-face interviews, the 1999/2000 estimate is regarded to be the most accurate. Minor quantities of bluenose are landed in other areas.

(c) Maori customary fishing

No quantitative information on the level of Maori customary take is available.

(d) Illegal catch

No quantitative information on the level of illegal catch is available.

(e) Other sources of mortality

No quantitative information is available.

2. BIOLOGY

Information on bluenose biology in New Zealand is based on research in QMA 2.

Bluenose grow quickly for the first two years, to average sizes of 31 and 45 cm fork length (FL) in the first and second year, respectively. Juvenile fish recruit to a demersal lifestyle from a presumed pelagic one at a length of around 47 cm FL. Females grow faster than males, and fish first spawn at

about 62 cm FL at age 4–5 years. Paul et al. (2004) used radiocarbon dating techniques on otoliths from 12 bluenose to determine whether the sudden 1960s increase in atmospheric/oceanic radiocarbon (^{14}C) levels, resulting from nuclear testing, could be detected in these otoliths. Based on the low levels of radioactive ^{14}C measured in the core of these otoliths, they concluded that the oldest fish in this sample were born prior to the beginning of the period of atmospheric testing and therefore were at least 25 years old (calculated from the date of otolith collection).

Little is known about the reproductive biology of bluenose. Spawning probably begins in late summer and may span several months. In the East Cape region, bluenose probably spawn from January to April. No distinct spawning grounds are known.

It is likely that estimates of natural mortality are influenced both by size specific variation in vulnerability to fishing gear, and by age specific migration to areas that are not currently fished. A maximum age of 25 years (Paul et al., 2004) in a lightly exploited population implies an estimate of 0.18 for natural mortality (M), using the method of Hoenig (1983). This is lower than the estimate for bluenose reported in previous Plenary documents (e.g. 0.3 based on Hoenig's method and a maximum age of 15 years (Horn & Massey, 1989)). However, the estimate of M = 0.18 should be considered preliminary as work on bluenose age and growth is still progressing.

Biological parameters relevant to stock assessment are shown in Table 2.

Table 2: Estimates of biological parameters for bluenose.

Fishstock	Estimate						Source
1. Natural mortality (M)							
BNS	0.18*						
2. Weight = a (length)^b (Weight in g, length in cm fork length)							
Both sexes							
BNS 2	a = 0.00963 b = 3.173						Horn (1988)
3. von Bertalanffy growth parameters							
	Females			**Males**			
	K	**t_0**	**L_∞**	**K**	**t_0**	**L_∞**	
BNS 2	0.308	-0.384	86.1	0.308	-0.627	81.1	Horn (1988)

*revised estimate from 2002; see text.

3. STOCKS AND AREAS

There are no new data that would alter the stock boundaries given in previous assessment documents. It is not known whether more than one stock of bluenose occurs in New Zealand waters. Tagging survey data from BNS 2 indicates that bluenose may be generally sedentary in the short term (6-8 months), although age specific migration may occur.

4. STOCK ASSESSMENT

There are no new data that would alter the yield estimates given in the 1996 Plenary Report. Yield estimates for BNS 2 are based on analysis of commercial CPUE data and have not changed since the 1991 Plenary Report.

(a) Estimates of fishery parameters and abundance estimates

BNS 1

Annual indices of abundance (standardized CPUE) were reported for BNS 1(1989/90 – 2004/05) as part of the adaptive management programme (SeaFIC, 2004a). The Bay of Plenty combined index for core vessels increased between 1989/90 and 1992/93, declined until 1996/97 and then increased consistently until 2002/03 and then declined sharply to 2004/05 (Fig. 1). The East Northland index was fairly stable, displaying no trend over the review period. Assuming that the indices reflect abundance on the respective fishing grounds, the AMP FAWG concluded that the fishery had not had much impact on BNS 1.

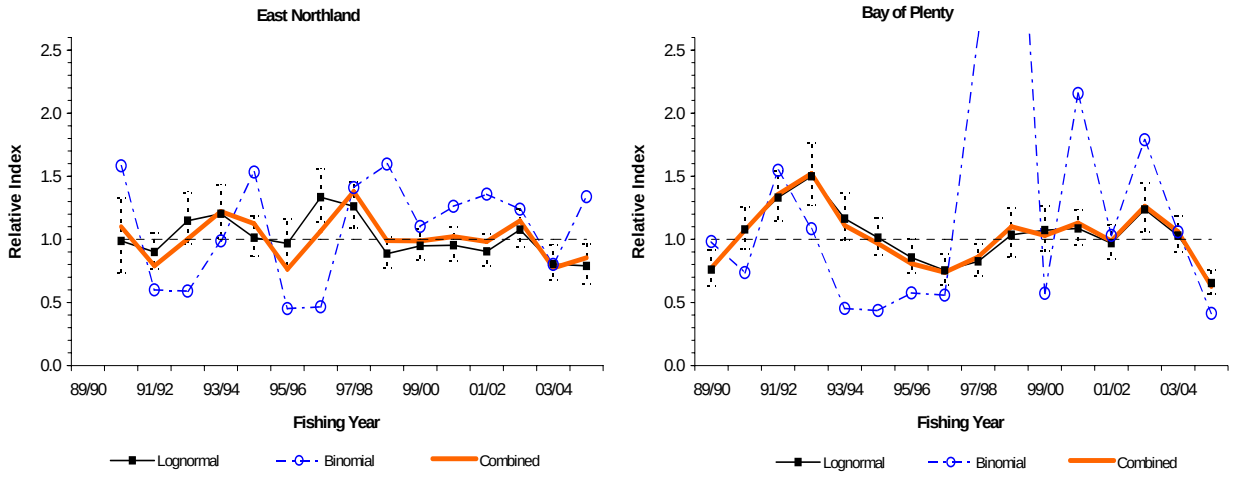


Figure 1. Three standardised CPUE models for the East Northland and Bay of Plenty bottom longline data [Starr et al., 2006a]: a) a lognormal model using non-zero landings as the dependent variable (with associated 95% lognormal error bars); b) a binomial (logistic) model using a binary variable indicating a successful or zero catch of bluenose and c) a combined model which summarises the two sets of indices into a single trajectory

BNS 7 and 8

Annual indices of relative abundance (standardized CPUE) were reported for BNS 7 & 8 (1989/90 – 2004/05) as part of the Adaptive Management Programme (AMP) (Starr, 2006b). However, given the large size of the area, relatively small amounts of data and the tendency for bluenose to aggregate on underwater features (not all of which are fished), the derived index is unlikely to reflect abundance because of the intermittent nature of the fishing and the effect of factors other than abundance on the behaviour of the fleet.

(b) Biomass estimates

Estimates of current biomass are not available for any Fishstock.

(c) Estimation of Maximum Constant Yield (MCY)

BNS 2

MCY cannot be estimated for this fishery. The previous estimate (520 t) was based on an estimated B_0 of 6600 t from an age-structured model. This fishery has sustained an average annual catch of approximately 1000 t between 1991–92 and 1995–96, which suggests that the estimated B_0 was conservative. Landings in BNS 2 have remained just above the 1000 t mark since 1995–96.

Other areas

Catch data for all areas before 1981 are inaccurate (much of the bluenose landed was reported as groper). Since 1981 catches have increased with considerable changes in effort and fishing methods. MCY cannot be estimated for other areas based on past landings data.

(d) Estimation of Current Annual Yield (CAY)

CAY cannot be estimated.

(e) Other yield estimates and stock assessment factors

$F_{0.1}$ was estimated to equal 0.36 for BNS 2, assuming an M of 0.3.

(f) Other factors

Bluenose may be resilient to fishing pressure due to widespread distribution, occurrence in untrawlable areas, and presumed juvenile pelagic life-style. However, the longevity and apparent resident nature of adults probably leads to localised depletion.

5. ANALYSIS OF ADAPTIVE MANAGEMENT PROGRAMMES (AMP)

The Ministry of Fisheries revised the AMP framework in December 2000. The AMP framework is intended to apply to all proposals for a TAC or TACC increase, with the exception of fisheries for which there is a robust stock assessment. In March 2002, the first meeting of the new AMP Working Group was held. Two changes to the AMP were adopted:

- a new checklist was implemented with more attention being made to the environmental impacts of any new proposal;
- the annual review process was replaced with an annual review of the monitoring requirements only. Full analysis of information is required a minimum of twice during the 5 year AMP.

BNS 1

The BNS 1 TACC increase (from 705 t) to 1000 t took effect in the 1996–97 fishing year under the AMP. From 1 October 2001 the AMP was renewed for five years at a TACC level of 1000 t.

Full-term Review of BNS 1 AMP in 2006

In 2006 the AMP FAWG reviewed the performance of the AMP after 4 years in the current 5-year term and 9 years at the higher TACC (Starr et al., 2005). The WG noted:

Characterisation

- The BNS 1 catch is mostly (90%) targeted: chiefly with bottom longline (86%), with a small percentage taken by dahn line.
- Given the size of the bottom longline catch and the fact that it is taken throughout the year, the CPUE associated with this method provides the best means for monitoring the fishery at this time.
- The 2002/03 and 2003/04 catches were slightly larger than the 1000 t TACC but the 2004/05 catch (870 t) was below this quantum. Catches are influenced by tuna availability as bluenose fishers also catch big eye and southern bluefin tuna.
- The BNS 1 fishery is comprised of three distinct spatial components: East Northland, the Bay of Plenty and the west coast of the North Island. Catches on the west coast have been intermittent and low due to the difficulty of fishing in this area by small longline vessels, the distance from available ports and the loss of the primary participant who fished in this area.

CPUE standardisation

- Data preparation/grooming was substantially improved for the 2004 analysis and has been further refined since then.
- Lognormal standardisation of Bay of Plenty non-zero bottom-longline catch per set for core vessels produced an annual CPUE index that increased between 1989/90 and 1992/93, declined until 1996/97 and then increased consistently until 2002/03 and then dropped over the last two years (2003/04 and 2004/05).
- East Northland non-zero catch indices were fairly stable, with a slight drop over the last two years of the review period.
- For both areas an index derived from binomial modelling of zero catches had little influence when combined with the non-zero, log-normal index.
- Owing to trends in fisher behaviour (e.g. area fished) and a shift to auto-longlining (i.e. more hooks per set), the standardised year effects may reflect factors other than abundance.

BNS 1 Decision Rule (abbreviated)

- A drop of 40% from the average abundance in any year (using Analysis A and based on the average for the entire six years [1989–90 to 1994–95], as calculated in that year) would

require that this assessment be referred back to the AMP FAWG for a re-evaluation of the TACC increase.

- The decision rules are, however, not considered necessary. A full analysis of all information is a more effective way to review the performance of the stock.

Effects of fishing

- Owing to deployment procedures (heavy weights, quick sinking, night setting), bottom longlining for bluenose should have a lower seabird mortality than other longlining methods.
- The Code of Practice will be reviewed shortly as a consequence of the NPOA for sea birds.
- Longlining has minimal impact on the benthos.
- Rates of capture/mortality of non-fish bycatch were not recorded, but will be recorded once the new Mfish non-fish bycatch form has been implemented.

Logbook Programme

- The purpose of this programme is to provide additional information on spatial-temporal changes in relative abundance, fishing effort and size structure that, in conjunction with MFish CPUE data, may be used to detect localized depletion.
- The BNS 1 logbook programme was originally intended to cover the bottom longline fishery and has two components: 1) detailed catch and effort information, including high resolution catch position and depth, and 2) biological information on the size/age composition or each sex in the catch (otoliths are currently collected, but will only be aged once an ageing protocol for bluenose has been finalized).
- The programme aims to achieve 100% coverage of the longline fishery. This fishery accounts for about 80% of total catch.
- Despite the target, overall coverage dropped from around 40-50% to 8-14% in recent years. Seasonal coverage was reasonable but spatial coverage was uneven with over-sampling in the Bay of Plenty and under-sampling in East Northland and the west coast of the North Island.
- As a result of decreasing coverage, the number of fish measured declined from almost 6000 in 1996/97 to 966 in 2004/05.
- Based on the catch composition from the logbook programme, the proportion of large females appears to have declined off East Northland and in the Bay of Plenty. Additional analysis revealed that while there was a weak relationship between fish size and depth (with smaller fish <500 m), changes in fisher behaviour (i.e. decrease in operating depth) did not appear to have caused the observed decrease in size of females in the catch.

Conclusion

- Overall the CPUE trends showed no long-term trend. Assuming that the CPUE indices reflect abundance, this would indicate that the fishery has not had a detectable impact on the resource. However, owing to changes in marketing and gear, the standardised CPUE may be affected by factors other than bluenose abundance.
- Logbook coverage has been inadequate in recent years, including poor spatial representability.
- This fishery should record high resolution spatial information for all sets, and not just those covered by the logbooks. The AMP FAWG concluded that the fishery should be using the new MFish LCER forms instead of the current CELR forms which only provide low spatial resolution. The availability of high spatial resolution effort and catch data would provide the potential to develop a better index of abundance, information about local spatial depletion, and better evaluation of the logbook programme. BNS 1 was believed to be above B_{MSY} when it was introduced into the AMP in 1996/97. Based on the size of the area currently fished in relation to the total area of BNS 1, the lack of a consistent trend in the standardised CPUE analysis and the fact that catches of 850-1050 t have been sustained for almost 10 years, BNS 1 is most likely above B_{MSY}.

BNS 2

The BNS 2 TACC was increased from 873 t to 1048 t under an AMP on 1 October 2004

Annual Review of BNS 2 AMP in 2006

In 2006 the AMP FAWG reviewed the performance of the logbook monitoring programme (Starr, 2006c). The WG noted:

- Target coverage is 50% of catch landed in each of the trawl and longline fisheries.
- Levels of coverage achieved in 2004/04 were not provided. However based on the numbers of fish measures coverage is likely to be <5%
- Log book coverage was inadequate

BNS 3

The BNS TACC was first increased (175-350 t) under an AMP during the 1992-93 fishing year. The TACC was further increased to 925 t when the current 5-year AMP term was initiated in October 2001.

Full-term Review of BNS 3 AMP in 2006

In 2006 the AMP Working Group reviewed the first 12 months of the increased BNS 3 AMP (Starr et al., 2006c). The WG noted:

Characterisation

- Approximately one third of the BNS 3 annual catch is targeted using bottom or mid-water trawl. The remainder is taken as a bycatch of the hoki trawl fishery, the ling bottom longline fishery and a target bluenose dahn line fishery.
- Reported catches in 2003/04 and 2004/05 were just below the 925 t TACC

CPUE Analysis

- CPUE was standardised for the first time.
- Standardisation of CPUE data sets for the following fisheries were undertaken:
    - the mid-water trawl fishery for bluenose and alfonsino on the Chatham Rise
    - the hoki bottom trawl fishery on the Chatham Rise,
    - a bottom longline fishery targeting bluenose and häpuku on the Chatham rise
    - a bottom longline fishery targeting ling on the Chatham rise
    - a bottom longline fishery targeting bluenose, häpuku and ling off Fiordland
    - a dahn line fishery off Fiordland.
- The use of a plus group to include all non-core vessels was not acceptable. It would be better to drop non-core vessels and associated data from the analysis.
- Owing to the uneven distribution of small catches of bluenose in space and time none of the series appeared to reflect BNS 3 abundance (diagnostics and precision were unacceptable).
- A comparison of BYX and BNS catches in the target bottom and mid-water trawl fisheries shows that the latter fishery appears to have been either actively avoided or possibly discarded bluenose prior to the 2000/01 fishing year. CPUE series for this fishery may be useful in future but should only begin in 2000/01. Analysis of high resolution spatial tow-by-tow information is necessary to properly evaluate this index.
- The Working Group noted that the target bluenose Chatham Rise trawl fishery is a good candidate for intercessional work to test the effect of the data preparation assumptions that are routinely made for the AMP CPUE work. This is because most of the data in this fishery are available on a tow-by-tow basis, but were analysed using the "trip rollup" methodology. This means that the year indices obtained by both methodologies can be directly compared as well as being able to analyse the effect of collapsing the data into "trip strata" on the estimates of model variance.

Logbook Programme

- The logbook programme covers the target longline and bottom and mid-water trawl fisheries for bluenose and alfonsino.

- The proportion of the total bluenose catch biologically sampled over the last three fishing years (2002/03 – 2004/05) ranged between 0.5% (2004/05) and 7%. Logbook coverage is therefore completely inadequate.

Effects of Fishing

- Owing to deployment procedures (heavy weights, quick sinking and night setting), bottom longlining for bluenose should have a lower seabird mortality than other longlining methods.
- A longline code of practice, aimed at reducing the impact on seabirds, has been developed and implemented by industry.
- All trawlers operating in BNS 3 are legally required to use seabird mitigation devices.
- Increases in bottom trawling effort resulting from the increased BNS 3 TACC are anticipated to increase impact on the sea floor, but the extent of this is not known. Detailed spatial information for all tows would help to evaluate this.
- Rates of capture/mortality of non-fish bycatch were not reported, but will be once the MFish Non-fish bycatch form has been implemented.

Conclusion

- One of the main objectives of the BNS 3 AMP was to obtain a better understanding of distribution and biology of the stock. Owing largely to poor coverage by the logbook programmes, the AMP has not been able to achieve the second part of the objective. However, the expansion of the bluenose fisheries in BNS 3 implicitly have gone some way to achieve the first part of the objective by obtaining greater understanding of the distribution of bluenose in BNS 3.
- The AMP programme for BNS 3 also relies heavily on the logbook returns to detect possible localised/serial depletion and therefore to monitor abundance. It was also the intention to use data from the logbook programme to evaluate potential CPUE-based indices of abundance. Inadequate sampling therefore compromises the monitoring capability of the programme.
- Based on historic catch, the size of the area and catches that have been sustained by BNS 2, BNS 3 is in all probability above B_{MSY}.
- There is, however, no currently acceptable index of abundance with which to monitor BNS 3.
- It is not known whether the current TACC is sustainable.

BNS 7 and 8

The BNS 7 TACC increase (from 97 t) to 150 t took effect in the 1994–95 fishing year under the AMP. The BNS 8 TACC increase (from 22 t) to 100 t under the AMP took effect in the same year. From 1 October 2001 these AMPs were renewed for five years at the same TACC levels.

Full-term Review of BNS 7 & 8 AMPs in 2006

In 2006 the AMP FAWG reviewed the performance of the AMPs after 4 years in the current 5-year term and 10 years at the higher TACCs (SeaFIC, 2004b). The WG noted:

Characterisation

- Despite the increase, the BNS 7 and BNS 8 TACCs remain substantially under-caught in both areas. This is attributed largely to economic factors and is not believed to have resulted from declining abundance.

CPUE standardisation

- The accepted abundance index for BNS 7 & 8 is based on standardized annual CPUE indices derived from bottom longline catch and effort data reported to MFish.
- Owing to the low number of trips, proximity of fishing grounds and fact that the many operators fish both areas, the catch and effort data were pooled for the standardisation analysis.

- Standardisation of non-zero bottom-longline catches (from the bluenose/häpuku target fishery) using a log-normal GLM produced variable annual indices between 1989/90 and 2004/05 with a slightly declining trend.
- A binomial modelling of zero catches revealed no trend in the annual indices and the combined index was also variable but flat.
- However, given the large size of the area, relatively small amounts of data and the tendency for bluenose to aggregate on underwater features (not all of which are fished), the derived index is unlikely to reflect abundance because of the intermittent nature of the fishing and the effect of factors other than abundance on the behaviour of the fleet.

Effects of fishing

- Owing to deployment procedures (heavy weights, quick sinking and night setting), bottom longlining for bluenose should have a lower seabird mortality than other longlining methods.
- A longline code of practice, aimed at reducing the impact on seabirds, has been developed and implemented by industry. Industry did not present any information on rates of compliance with the code of practice.
- Rates of capture/mortality of non-fish bycatch were not reported, but will be once the Mfish Non-fish bycatch form has been implemented.

Logbook Programme

- Between two and three vessels in BNS 7 and zero to three vessels in BNS 8 provided detailed catch and effort information each year from 2001/02 to 2004/05. The proportion of the annual catch covered by logbook programmes ranged from 16-36% and 7-32% in BNS 7 and 8, respectively.
- Spatial and temporal coverage were poor.
- No otoliths have been collected since the main participant left the fishery in the late 1990s.

Conclusion

- BNS 7 and 8 had been only lightly exploited prior to being introduced into the AMP in 1994/95, and were regarded as being well above B_{MSY} at that time. Based on the lack of any evidence for a declining trend in CPUE, the low cumulative catch under the AMP regime in relation to the size of the area, the BNS 7 and 8 biomass, in all probability, remains larger than B_{MSY}.
- Without fine scale spatial reporting of catch and effort by all participants in the fishery (i.e. switching from CELR to LCER), it is probably not possible to use standardised CPUE to monitor abundance.
- Reviews of the logbook programme in 2004, 2005 and now in 2006 have all concluded that coverage is inadequate. The AMP programme for BNS 7 and 8 relies heavily on the logbook returns to detect possible localised/serial depletion. Inadequate sampling therefore compromises the monitoring capability of the programme.
- Future logbook programmes should collect otoliths.
- It is unclear whether current catch or the TACC are sustainable.

6. STATUS OF THE STOCKS

No estimates of current and reference biomass are available.

BNS 1

The TACC for BNS 1 was increased from 705 t to 1000 t for the 1996–97 fishing year under the AMP. Commercial CPUE from 1998–90 to 2004/05 shows no trend, but owing to changes in marketing and gear, the standardised CPUE may be affected by factors other than bluenose abundance.

BNS 1 was believed to be above B_{MSY} when it was introduced into the AMP in 1996/97. Based on the size of the area currently fished in relation to the total area of BNS 1, the lack of a consistent trend in the standardised CPUE analysis and the fact that catches of 850 - 1050 t have been sustained for almost 10 years, BNS 1 is most likely above B_{MSY}. It cannot, however, be determined if the new TACC of 1000 t is sustainable or will allow the stock to move towards the size that will support the maximum sustainable yield.

BNS 2

Catch levels between 919 and 1288 t have been sustained in this fishery since the early 1990s (under TACCs ranging from 833 to 873 t). The BNS 2 TACC was increased from 873 t to 1048 t under an AMP on 1 October 2004. It is not known if recent catch levels or the current TACC are sustainable or if they are at levels that will allow the stock to move towards the size that will support the maximum sustainable yield.

BNS 3

The TACC for BNS 3 was increased to 925 t for the 2001–02 fishing year (plus an additional 250 t of ACE for two years) under the AMP. It is not known if recent catch levels or the current TACC are sustainable or if they are at levels that will allow the stock to move towards a size that will support the maximum sustainable yield. However, as BNS 3 is a large area and some FMAs (for example the Chatham Rise) have been lightly fished; the increased TACC, if appropriately apportioned across areas, is likely to be sustainable.

BNS 7

The TACC for BNS 7 was increased from 97 t to 150 t under the AMP. Recent catch levels and the current TACC are having no apparent effect on stock size and are probably sustainable in the short-term. The stock is likely to be above B_{MSY} and may be near its virgin size. It is not known if recent catch levels or the current TACC are at levels that will allow the stock to move towards a size that will support the maximum sustainable yield.

BNS 8

The TACC for BNS 8 was increased from 22 t to 100 t under the AMP. Recent catch levels and the current TACC are having no apparent effect on stock size and are probably sustainable in the short-term. The stock is likely to be above B_{MSY} and may be near its virgin size. It is not known if recent catch levels or the current TACC are at levels that will allow the stock to move towards a size that will support the maximum sustainable yield.

TACCs and landings are summarised in Table 3.

Table 3: Summary of TACCs (t) and reported landings (t) for bluenose for the most recent fishing year.

Fishstock	QMA		2005–06 Actual TACC	2005–06 Reported landings
BNS 1	Auckland (East) (West)	1 & 9	1023	695
BNS 2	Central (East)	2	1048	1136
BNS 3	South–East (Coast) (Chatham), Southland and Sub–Antarctic	3, 4, 5, 6	925	535
BNS 7	Challenger	7	155	84
BNS 8	Central (West)	8	103	20
BNS 10	Kermadec	10	10	0
Total			3264	2470

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