Ministry of
Fisheries
Te Tautiaki i nga tini a Tangaroa

Review of Sustainability Measures and Other Management Controls for Bluenose (BNS 1, 2, 3, 7 and 8) Initial Position Paper June 2011

New Zealand Government

Introduction

1 This Initial Position Paper (IPP) provides the Ministry of Fisheries (the Ministry's) initial views on proposals relating to sustainability measures for bluenose (BNS 1, 2, 3, 7 and 8) fish stock for the 2011/12 fishing year, commencing on 1 October.

2 The Ministry developed this Initial Position Paper (IPP) for the purpose of consultation as required under the Fisheries Act 1996 (the Act). The Ministry emphasises the views and recommendations outlined in the paper are preliminary and are provided as a basis for consultation with stakeholders.

3 In August 2011, the Ministry will compile the Final Advice Paper (FAP) for the attached proposal. This document will summarise the Ministry's and stakeholder views on the issues being reviewed, and provide final advice and recommendations to the Minister of Fisheries and Aquaculture. A copy of the FAP and subsequently the Minister's letter setting out his final decisions will be posted on the Ministry's website as soon as it becomes available with hard copies available on request.

Deadline for Submissions

4 The Ministry welcomes written submissions on the proposals contained in the IPP. All written submissions on this consultation document must be received by the Ministry no later than 4pm on Friday, 29 July 2011.

Written submissions should be sent directly to:

Trudie Macfarlane
Ministry of Fisheries
P O Box 1020
Wellington

or emailed to Trudie.Macfarlane@fish.govt.nz

5 All submissions are subject to the Official Information Act and can be released, if requested, under the Act. If you have specific reasons for wanting to have your submission withheld, please set out your reasons in the submission. The Ministry will consider those reasons when making any assessment for the release of submissions if requested under the Official Information Act.

Bluenose (BNS 1, 2, 3, 7 and 8)

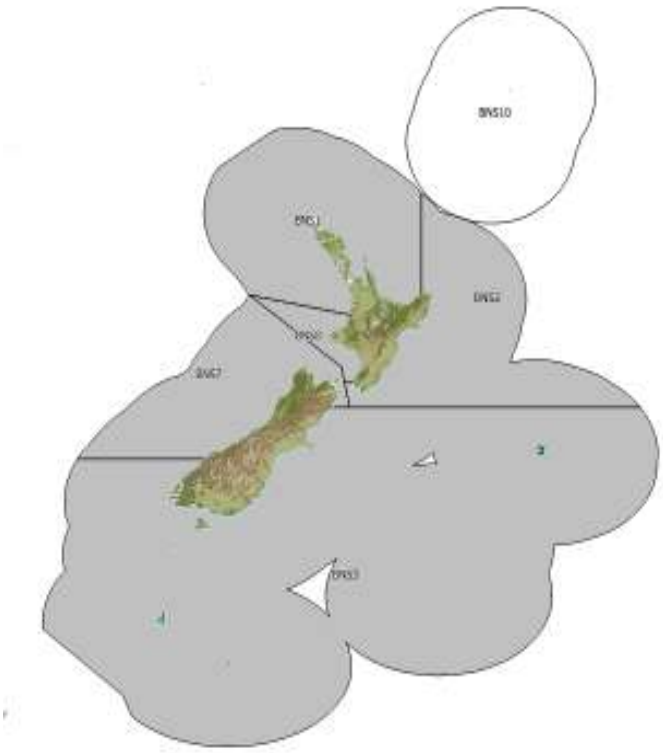


Figure 1. The Quota Management Area (QMA) boundaries for bluenose.

Summary

1 The Ministry of Fisheries (the Ministry) is seeking tangata whenua and stakeholder views on proposals to change the Total Allowable Catch (TAC) levels and sector allowances for the BNS 1, 2, 3, 7 and 8 quota management areas (QMAs).

2 The combined TACs for the bluenose QMAs are considered to be unsustainable; when assessed as a single biological stock, current bluenose stock size (B_{CURR}) is below the target stock size (B_{TGT}, which is $40\%B_0$) and projected to continue to decline under the current TACs.

3 The stock assessment model used to assess the status of bluenose contains uncertainties but has been accepted by the Fisheries Assessment Plenary[1] (the Plenary) and provides the best available information for assessing management options.

4 Four management options are presented (Table 1). No status quo option is included as, under current TACs, stock size is projected to decline and fall below the hard limit reference point[2] (hard limit) within five years.

[1] The Plenary Report summarises biological, fishery, stock assessment and stock status information. The Plenary takes into account the most recent data and analyses available to Fisheries Assessment Working Groups (FAWGs) and the Plenary.

[2] A hard limit is a biomass limit below which the Ministry's *Harvest Strategy Standards* triggers consideration of fishery closure. The hard limit for bluenose is $10\%B_0$.

Table 1: Proposed and Current Management Options for BNS 1, 2, 3, 7 and 8

Option	Combined Year 1 Total TAC (t)	Combined Total TACC (t)			Combined Total Māori customary allowance (t)	Combined Total Other Sources of Mortality (t)			Recreational	
									Combined Total Allowance (t)	Bag limit applying to each QMA
Current Settings	2477	2325			42	47			63	20 (part of mixed bag)
1	787	700			9	15			63	5
2	991	900			9	19			63	5
3	1705	2011/12	2012/13	2013/14	9	2011/12	2012/13	2013/14	63	5
		1600	1150	700		33	23	15		
4	1603	2011/12	2013/14	2015/16	9	2011/12	2013/14	2015/16	63	5
		1500	1130	440		31	23	9		

5 The four options represent different ways and/or rates of rebuilding the bluenose to B_{TGT}:

- **Option 1** is derived from the Ministry's *Harvest Strategy Standard*. It seeks to rebuild the stock to B_{TGT} in 20-26 years. This is consistent with the *Harvest Strategy Standard* rebuild time for a stock at or below its soft limit reference point[3] (soft limit) of $2xT_{min}$ (where T_{min} is the length of time the stock would take to rebuild if there was no fishing).

- **Option 2** has a longer rebuild timeframe; it seeks to rebuild the stock to B_{TGT} in 30-36 years ($3 \times T_{min}$). A longer rebuild timeframe allows a higher TAC to be set; a higher TAC may be appropriate to mitigate the short-term social, cultural and economic impacts, particularly on the commercial sector.

6 Options 3 and 4 use staged cuts to the TACs, rather than the single cut proposed in Options 1 and 2. Options 3 and 4 mitigate short-term social, cultural and economic impacts, particularly on the commercial sector, by providing more time to adjust to lower catch limits.

- **Option 3** proposes three consecutive cuts, reducing the TAC by 772 tonnes (t) in 2011/12, 460 t in 2012/13 and 918 t in 2012/13. Option 3 is projected to rebuild the stock to B_{TGT} in 18 to 36 years, which is $2\text{-}3xT_{min}$.

- **Option 4** proposes three cuts over five years, reducing the TAC by 874 t in 2011/12, 378 t in 2013/14 and 704 t in 2015/16. Under this rebuild plan, the projected rebuild time to B_{TGT} in 16 to 27 years, which is $2xT_{min}$. This option has been put forward by the four inshore commercial finfish stakeholder organisations and the major bluenose quota owners (hereafter referred to as "industry representatives").

7 For all options, it is proposed the bulk of the TAC cut be borne by the commercial sector. The commercial sector takes the greatest proportion of bluenose overall and has benefitted from TAC increases in the past. All options, excepting Option 4, propose that the cut is

[3] A soft limit is a biomass limit below which the *Harvest Strategy Standard* triggers a formal, time-constrained rebuilding plan. The soft limit for bluenose is $\frac{1}{2}B_{TGT}$ or $20\%B_0$.

allocated proportionally across the QMA Total Allowable Commercial Catches (TACCs) *after* taking into account 2007/08 bluenose TACC reductions in each QMA[4].

8 Changes to customary Maori allowances and the recreational bag limits applying in each QMA are also proposed. For customary Maori, the changes reflect new information that indicates little bluenose is taken using customary permit authorisations at this time. For the recreational sector, the bag limit changes proposed seek to constrain recreational catches to the current recreational allowance levels.

9 The Ministry also proposes changing the BNS 1, 2, 3, 7 and 8 deemed value rates, which apply to commercial fishers that over-catch their annual catch entitlement (ACE). For further information, please refer to the *Deemed Value* Initial Position Paper.

Context

Need to Act

10 Bluenose fisheries are managed under section 13 of the Fisheries Act 1996 (the Act). For section 13 stocks, the minimum B_{TGT} is the stock size that can produce the maximum sustainable yield (B_{MSY}); the Minister of Fisheries is required to set TACs for section 13 stocks that enable the stocks to be maintained at, or move towards, a level at or above $B_{MSY.}$ If information is uncertain, the Minister is required to set TACs that are not inconsistent with this objective.

11 B_{MSY} has not been calculated for bluenose. However, a proxy for B_{MSY} – $40\%B_0$ – has been accepted by the Plenary as the minimum B_{TGT}. A stock assessment in 2011 assessed current stock size for bluenose (when a single New Zealand biological stock is assumed) at below B_{TGT} and as likely as not below the soft limit reference point.

12 The stock assessment also projected the stock would continue to decline under current TACs and current catch levels. Consequently, the combined TACs for all bluenose fisheries are not consistent with the obligations of the Act.

Bluenose Biological Characteristics & Associated Species

13 Bluenose are a long-lived species, with an estimated maximum age of 76 years. From the range of estimates resulting from recent ageing research, the working group concluded that natural mortality for bluenose was unlikely to be greater than 0.1. These biological characteristics indicate that bluenose is a low productivity stock.

14 Biological stock boundaries are unknown for New Zealand bluenose, but similarities in catch per unit effort (CPUE) trends between each of the five bluenose QMAs suggests there may be just one biological stock across all these areas, or a strong relationship between the fish in these areas. Tagging studies have shown bluenose are capable of extensive migration, which suggests the single stock hypothesis is possible. However, there is no conclusive information available to confirm this hypothesis or alternate hypotheses of stock relationships.

15 There is some evidence bluenose fisheries may be hyper-stable; a period of stability in abundance indices was observed while commercial catch increased, followed by a rapid decline, suggesting key fishing areas were being replenished through fish moving into the areas. Alternatively, there could be a simultaneous drop in recruitment due to coincident environmental factors. An environmental mechanism simultaneously affecting availability or catchability of bluenose across all QMAs is considered by the Plenary to be less likely than the possibility of a single stock, or of correlated recruitment across sub-stocks in the various areas.

[4] For option 3, the proportions the TACC's equal in 2011/12 differ slightly (by < 0.5%), due to the BNS 8 TAC being retained at status quo.

16 Bluenose are preyed upon by other fish species, such as broadbill swordfish. The significant decline in bluenose biomass may have an impact on predator species like broadbill swordfish, subject to the availability of alternative food sources. A decline in abundance may also affect other complex interactions within the ecosystem. For example, bluenose are likely to be important predators, feeding on tunicates, fish, squid and crustaceans and a change in predation pressure may alter competitive interactions between these species.

Stock Status

17 The first fully quantitative stock assessment modelling for bluenose was carried out in 2011. The stock assessment:

- Assumed a single New Zealand biological stock
- Adopted a minimum B_{TGT} of 40%B_0, a soft limit of 20%B_0 and a hard limit of 10%B_0, based on the *Harvest Strategy Standard* defaults for low productivity stocks
- Estimated current stock status (B_{CURR}) at 14-27%B_0, which is less than B_{TGT} and as likely as not to be less than the soft limit.
- Projected that, at current catch levels, stock size would continue to decline and fall below the hard limit within five years.

18 The stock assessment includes a number of assumptions and uncertainties, which are set out in Appendix 1. Key uncertainties are:

- The appropriate values for biological parameters such as natural mortality and the steepness of the stock-recruit curve.
  The stock assessment model incorporates this uncertainty by using a range of input values for these biological parameters. Thus, the predicted changes in biomass under different future catch scenarios range from more pessimistic to more optimistic, depending on the input value for each biological parameter (see Appendix 2).
- The single biological stock assumption.
  Alternative stock hypotheses have not yet been thoroughly explored, however, it is likely that the alternative stock hypotheses already raised would result in a more pessimistic view of overall stock status. If the Minister considers there to be uncertainty that bluenose is a single stock, the Ministry advises a more cautious approach be taken to ensure stock sustainability.

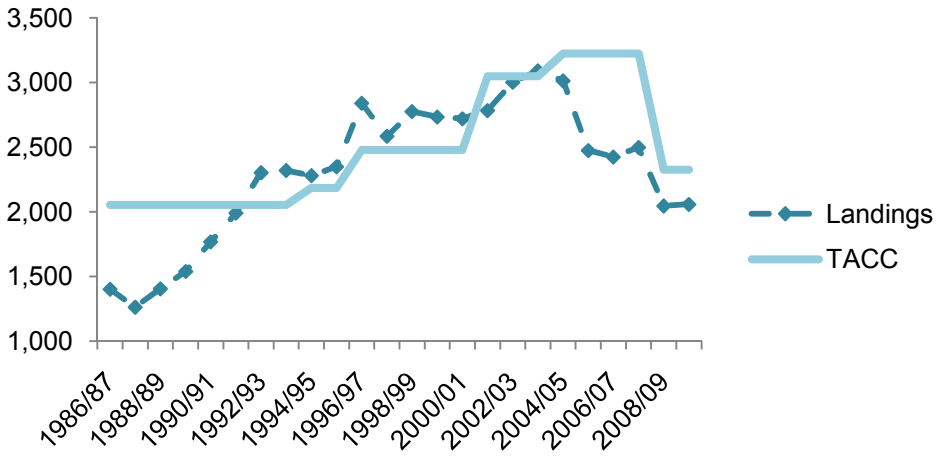
19 The stock assessment provides the best available information on stock status and how future stock size is expected to change under different catch levels. However, model uncertainties should be considered when assessing each proposed option.

Bluenose Fisheries

<u>Commercial</u>

20 The commercial fishing sector harvests the greatest portion of bluenose. Total reported landings of bluenose by the commercial sector are shown in Figure 2.

Figure 2. Total reported landings (t) of bluenose and total TACCs (t) from 1986–87 to 2009–10 for BNS 1, 2, 3, 7 and 8.



21 Between 1992 and 2009, all bluenose fishstocks were included, for at least some of the time, in Adaptive Management Programmes (AMPs). The goal of the AMP was to increase commercial utilisation in low knowledge stocks while providing a cost-effective way to obtaining more information on stock size.

22 Under AMPs, the bluenose combined TACCs increased by over 1000 t (Figure 1). In response to information suggesting declines in abundance in BNS 1, 2, 3, 7 and 8, TACCs in these QMAs were reduced in 2008 to the current combined TACC of 2480 t (Table 1) and additional research was initiated.

23 Commercial harvest levels were identified as a key driver of the decline in stock abundance. The Plenary noted other drivers such as recruitment and environmental factors may also have contributed.

Recreational

24 The total combined recreational allowances for all bluenose QMAs is 63 t. This allowance level is based on 2000/01 diary survey estimates of recreational catch. Anecdotal information from Recreational Forum members suggests recreational fisher interest in bluenose may have increased in recent years.

25 Information on recreational catch of bluenose is uncertain. The Recreational Technical Working Group has indicated its concerns with telephone/diary surveys. The following summarises that group's views on the estimates:

> "*the harvest estimates from the diary surveys should be used only with the following qualifications: a) they may be very inaccurate; b) the 1996 and earlier surveys contain a methodological error; and, c) the 2000 and 2001 harvest estimates are implausibly high for many important fisheries*."

Customary catch

26 Information on customary Maori catch of bluenose is uncertain. Some information on customary Maori harvest of fish is available from reporting of customary fishing authorisations. This information is incomplete and highly uncertain as many tangata whenua groups still operate under regulation 27 and 27A of the Fisheries (Amateur Fishing) Regulations 1986, for which reporting is not mandatory.

27 No customary authorisations have been reported for bluenose in any QMA since 2007. This may indicate that tangata whenua use of customary Maori harvesting rights (as opposed to commercial or recreational) is low at this time.

Proposed Response

28 As bluenose has been assessed as being below B_{TGT}, the primary management objective is to rebuild the stock size. This is to be achieved by setting the combined TACs for BNS 1, 2, 3, 7 and 8 at a level that will allow the stock to rebuild to B_{TGT}, consistent with section 13 of the Fisheries Act 1996 (the Act).

29 Section 13(2) of the Act sets a minimum B_{TGT} of B_{MSY}. The available information on BNS 1, 2, 3, 7 and 8 is insufficient to enable estimates of B_{MSY}. Where estimates of B_{MSY} are not available, section 13(2A) of the Act provides for the Minister to use the best available information to set a TAC that is not inconsistent with the objective of moving the stock towards or above B_{MSY}. The Plenary has accepted a proxy minimum B_{TGT} for bluenose of 40% B_0, This B_{TGT} is consistent with the *Harvest Strategy Standard* guidance on low productivity stocks.

30 All options have the objective of rebuilding the biological stock to B_{TGT} but the options differ in the way in which, and/or the rate at which, a rebuild is achieved. These different rebuild approaches take into consideration social, cultural and economic impacts.

Summary of Options

TAC Setting

31 Four options are proposed for reviewing the TAC of BNS 1, 2, 3, 7 and 8 (refer Table 1):

Option 1: Reduces the combined TAC to 787 t. At this TAC, bluenose is projected to rebuild to B_{TGT} in 20-26 years, which is $2xT_{min}$, the *Harvest Strategy Standard* recommended rebuild timeframe for a low productivity stock at or below the soft limit.

Option 2: Reduces the combined TAC to 991 t. At this TAC, bluenose is projected to rebuild to B_{TGT} in 30-39 years, which is $3xT_{min}$.

Option 3: Reduces the combined TAC in three consecutive, staged reductions – to 1705 t in 2011/12, to 1245 t in 2012/13, and to 787 t in 2013/14. Under this strategy, bluenose is projected to rebuild to B_{TGT} in 18-36 years, which is $2\text{-}3xT_{min}$.

Option 4: Reduces the combined TAC in three staged reductions over five years – to 1603 t in 2011/12, to 1225 t in 2013/14 and to 521 t in 2015/16. Under this strategy, the bluenose biological stock is projected to rebuild to B_{TGT} in 16-27 years, which is $2xT_{min}$.

32 Although Options 3 and 4 set out staged TAC strategies, the Minister can only at this time make a decision about the TAC's for the 2011/12 fishing year. Future reductions will require separate considerations that take into account any new information. If the Minister chooses Options 3 or 4 above, the Minister would be adopting the 2011/12 TAC specified in the option; agreeing in principle to the TAC strategy set out in the option, and indicating an intention to review the TAC and sector allowances again at the times specified.

Analysis

Main Considerations

Stock sustainability

33 Under a single biological stock assumption, the stock assessment has assessed B_{CURR} at 14-27%B_0, which is well below B_{TGT} and as likely as not to be below the soft limit.

34 Each TAC option is designed to rebuild bluenose to B_{TGT}. The relative sustainability risk associated with each option is indicated by:

a) How quickly stock size is returned to the target level, B_{TGT}.
A slower rebuild time means the stock spends longer in a more vulnerable state. The HSS states "the lower the biomass, the more biological and ecological concerns take precedence over social and economic considerations and the closer to T_{min}".

b) The extent to of any further decline in stock size.
A further decline in stock size may reduce the capacity of the stock to rebuild.

c) The amount of time stock size is below the soft limit reference point.
While the stock is below the soft limit, the stock is considered to be at an unsustainably low level. To ensure stock sustainability, it is recommended the stock be moved to above 20% B_0 as soon as possible.

35 Stock assessment projections relating to each of these criteria are set out in Table 2 below. A range of values is presented, which reflects uncertainty in the stock assessment model; the range represents the full range of plausible input values for bluenose biological parameters.

36 The projections set out in Table 2 assume that the future reductions indicated in Options 3 and 4 are implemented as outlined and that the final TAC level is retained until B_{TGT} is achieved.

Table 2: Performance of options against sustainability criteria

	Option 1	**Option 2**	**Option 3**	**Option 4**
a) **Rebuild timeframe to B_{TGT}**				
Projected timeframe for stock size to reach B_{TGT}	20 – 26 yrs ($2T_{min}$)	30 – 39 yrs ($3T_{min}$)	18 – 36 yrs ($2\text{-}3T_{min}$)	16 – 27 yrs ($2T_{min}$)
Comparison	Options 1 and 4 have shorter rebuild timeframes than Options 2 and 3.			
b) **Number of years stock size will continue to decline and extent of decline**				
Projected length of time stock size continues to decline	1 – 5 yrs	2 – 6 yrs	2 – 6 yrs	2 – 6 yrs
Projected lowest stock size	14.5% B_0	14.5% B_0	13.8% B_0	13.8% B_0
Comparison	Options 1 and 2 have larger lowest stock sizes than Options 3 and 4.			

c) **Time spent below soft limit reference point, 20%B_0**				
Time stock size below soft limit	0 – 7 yrs	0 – 9 yrs	0 – 10 yrs	0 – 10 yrs
Comparison	The potential number of years below the soft limit is lowest for Option 1.			

37 In summary, with respect to sustainability, the indicators suggest:

- Option 1 is the lowest risk option; and
- Option 3 is the highest risk option.

Social, cultural and economic costs

38 Each option will result in short- and long-term costs to the fishing sectors. The size of the reductions to catch limits will determine the extent of, and who bears, the costs.

39 Cost estimates are set out in Table 3 below. The short-term costs are based on commercial value measures and assume the commercial sector will bear the full amount of the costs. The long-term costs are presented as volume of lost catch opportunities. To provide a static reference point, the lost catch estimates assume total catches will return to the level represented by the current TAC once stock size is rebuilt to B_{TGT}. Given the revised estimates of bluenose productivity, the maximum sustainable yield may not be as high as previously thought and thus catch levels may not return to recent levels.

Table 3: Short- and long-term costs of each option

	Option 1	**Option 2**	**Option 3**	**Option 4**
1. **Short-term cost to commercial sector**				
Estimated cost in first year (based on 09/10 port price)	$7.5 million	$6.5 million	$3.1 million	$3.4 million
Estimated cost in first 5 years (based on 09/10 port price)	$37.4 million	$32.5 million	$30.8 million	$25.3 million
Comparison	Options 3 and 4 would result in smaller short term costs to the commercial fishing sector than Options 1 and 2.			
2. **Longer-term cost to commercial sector**				
Projected timeframe for stock size to reach B_{TGT}	2031 - 2037	2041 – 2050	2029 – 2047	2027 – 2038
Forgone catch 2011/12 to 2050/51 (nearest 1000 tonne)	33-42,000 t	43-56,000 t	28-57,000 t	27-47,000 t
Comparison	Options 1 and 4 would result in smaller long-term costs to the commercial fishing sector than Options 2 and 3.			

40 In summary, with respect to social, cultural and economic impacts on commercial fishers, assuming they bear the cost of the catch reductions:

- Option 4 has the lowest impacts overall
- Option 2 has the highest impacts overall.

41 Impacts on other fishing sectors are likely to be lowest under Option 1; that is, the option with the shortest rebuild timeframe and greatest certainty of rebuild.

Distribution of total TAC across QMAs

42 The proposed distribution of the TAC across the bluenose QMAs is set out in Table 4 below. For all options excepting Option 4, it is proposed the cut is allocated proportionally across the QMAs *after* taking into account 2007/08 bluenose TAC and TACC reductions in each QMA and new information on customary Maori harvest (refer para 44 below). The Option 4 distribution has been put forward by industry representatives.

Table 4: Distribution of Proposed Total TAC across bluenose QMAs

Stock	Current TAC (t)	Option 1 (t)	Option 2 (t)	Option 3 (t)	Option 4 (t)
BNS 1	825	238	302	526	567
BNS 2	958	259	326	560	634
BNS 3	551	225	283	490	259
BNS 7	96	39	48	82	96
BNS 8	47	26	32	47	47

TACC and Allowance Setting

43 For all options, it is proposed the bulk of the TAC cut be borne by the commercial sector. The commercial sector takes the greatest proportion of bluenose overall and has benefitted from TAC increases in the past. All options, excepting Option 4, propose that the cut to the TACC is distributed proportionally across the QMA TACCs *after* taking into account 2007/08 bluenose TACC reductions in each QMA. The Option 4 distribution has been put forward by industry representatives. The distributions are set out for each option in Tables 5, 6, 8 and 10 below.

44 Changes to customary Maori allowances applying in each QMA are also proposed. The proposed changes do not seek to reduce harvesting by tangata whenua. Rather, the changes reflect new information that indicates little bluenose is taken using customary permit authorisations. The Ministry notes that:

- the adjustment to the allowance does not constrain customary Maori catch as harvest is authorised by Tangata Tiaki/Kaitiaki or authorised permit issuers
- accurate information on customary harvest levels is important to support stock status assessments as poor information affects the quality of the assessments (for example, an over estimate of harvest can result in overly optimistic assessments of stock productivity).

45 No change to the recreational allowance is proposed for any QMA. The recreational allowance levels are based on 2000/01 diary survey estimates of recreational catch and no new information is available to inform new allowances. Changes to recreational bag limits are proposed for bluenose, however (refer *Other Management Measures* section). Anecdotal information from Recreational Forum members suggests recreational fisher interest in bluenose may have increased in recent years. The proposed changes to the bag limits are designed to constrain catches to current levels in recognition of current stock status.

46 Quantitative estimates of other sources of fishing-related mortality are not available for bluenose. In previous TAC setting decisions for bluenose, an allowance for other sources of fishing-related mortality has been estimated at 2% of the TACC. The proposed decreases in allowances for other sources of fishing-related mortality approximately retain this proportion.

Analysis of Individual Options

Option 1

47 Option 1 is based on the range of maximum commercial catch (refer to Appendix 2) predicted by the stock assessment model that is likely to allow the stocks to rebuild in $2xT_{min}$. Table 5 sets out the TACs and sector allowances proposed for each QMA under Option 1.

Table 5. Proposed TAC's and allowances for each QMA in Option 1.

Stock	Current TAC (t)	TAC (t)	TACC (t)	Māori customary allowance (t)	Recreational Allowance (t)	Other sources of mortality (t)
BNS 1	825	238	217	2	15	4
BNS 2	958	259	227	2	25	5
BNS 3	551	225	201	2	18	4
BNS 7	96	39	33	2	3	1
BNS 8	47	26	22	1	2	1

Benefits

48 Option 1 is the most cautious option; it provides the greatest certainty of stock rebuild.

49 Reducing stock size to very low levels can have irreversible effects on the stock, ecosystem, and other species. Option 1 gives the highest chance of such impacts being avoided or mitigated, as it provides the greatest assurance of a rebuild in stock size to a healthy level.

50 International markets are becoming increasingly sensitive to sustainable management practices. Over the last five years, an average of 1200 t of bluenose has been exported annually to Australia and the US, with an approximate value of $12.6 million. Whilst all options presented in this paper are consistent with sustainable management practices, Option 1 is the most cautious option and may be viewed the most favourably.

51 Option 1 has the lowest long-term cost to all fishing sectors, as it has a relatively short estimated rebuild time and greatest certainty that the rebuild will be achieved.

Costs

52 Option 1 has the largest short-term impact on the commercial sector. The proposed TACC is 68% less than average catches from the last three years, which represents a potential loss in domestic revenue of $6.3 million in the next year (based on 2009/10 port price) and $9.1 million in export revenue in the next year (based on a proportional decrease of 68% in export revenue). The expected loss in ACE revenue is around $2 million (see Appendix 4 for more detail). The loss of ACE revenue may be offset by an increase in the price of ACE, however the Ministry is unable to estimate the future price of ACE.

53 Option 1 is likely to affect all fishers' landing bluenose to some extent. Over the last five years, the annual quantity of bluenose taken as bycatch in other fisheries has totalled 445-751 t (see Appendix 3 for more information). A combined total TACC of 700 t is therefore likely to reduce the target bluenose fishery significantly in most areas and may impact bluenose bycatch fisheries in some areas.

54 There is risk under Option 1 that ACE may not be redistributed among fishers in a way that allows bycatch to be covered, resulting in potential over-catch and a consequential risk to the projected rebuild timeframe. Only a small portion of quota (<1%) is owned by fishers who predominantly long-line and may wish to continue to target bluenose using their ACE, rather than make it available to other bycatch fishers. This reduces the risk but does not eliminate it; risk levels will depend on the approach taken to distribution of ACE by quota owners.

55 In 2009/10, 134 fishers landed bluenose. For the majority of these fishers (77%), bluenose made up less than 10% of their total landed catch weight. This suggests the majority of fishers currently taking bluenose are not overly dependent on bluenose landings and may be able to absorb the impact of the proposed reductions.

56 For some fishers, bluenose landings represent a significant proportion of their catch and income. The reduction in the availability of ACE is likely to force these fishers to either target other stocks or stop fishing altogether. In 2009/10, there were 15 fishers for whom bluenose represented over 30% of the weight of their total landed catch. SeaFIC has estimated that around 18 companies are financially dependent on target bluenose bottom-line fishing.

57 Many affected fishers may initially transfer effort to other long-line fisheries. SeaFIC has noted that with long-line catches of häpuka/bass and ling already being a high proportion of the TACCs in these fisheries, there is little capacity in those fisheries to absorb transfer of effort from the bluenose fishery.

Future considerations

58 The decreases to the TACs and TACCs proposed under Option 1 are likely to result in changes to fishing practices, such as the withdrawal of vessels and changes in the spatial and temporal distribution of fishing effort. This may affect the ability to monitor the fishery effectively as it will likely disrupt the continuity of the CPUE series, which is currently used as the indicator for bluenose abundance.

59 As stocks rebuild, the amount of bluenose taken as bycatch can increase. Where increases are not easily accommodated within catch limits, this can create an incentive for dumping and/or misreporting. Under Option 1, bycatch levels are most likely to exceed the TACCs in BNS 2, 3 and 7, where the level of bycatch recorded between 1994/95 and 2004/05 are close to the proposed TACCs (see Appendix 3). Should bycatch levels threaten rebuild of the bluenose stock, management measures for bluenose or associated fisheries may need to be reviewed.

Option 2

60 Option 2 is based on the range of maximum commercial catch (refer to Appendix 2) predicted by the stock assessment model to allow the stocks to rebuild to B_{TGT} in $3xT_{min}$. Table 6 sets out the TACs and sector allowances proposed for each QMA under Option 2.

Benefits

61 The short-term impacts on the commercial fishing sector under Option 2 are less than for Option 1 (refer Table 3). Under Option 1, fishers would be able to land 200 t more bluenose per year (with an annual value of approximately $0.9 million, based on 09/10 port price). However, the relatively small difference between the TACs proposed under Options 1 and 2 may not significantly alter the number of individual fishers negatively impacted by the decreases.

Table 6. Proposed TAC's and allowances for each QMA in Option 2.

Option	Current TAC (t)	TAC (t)	TACC (t)	Māori customary allowance (t)	Recreational Allowance (t)	Other sources of mortality (t)
BNS 1	825	302	279	2	15	6
BNS 2	958	326	293	2	25	6
BNS 3	551	283	258	2	18	5
BNS 7	96	48	42	2	3	1
BNS 8	47	32	28	1	2	1

62 Although Option 2 has the longest rebuild timeframe, there is greater certainty to the projected timeframe compared to Options 3 and 4, whose rebuild timeframes have wide ranges. This provides greater certainty for planning.

63 The projected lowest stock size under Option 2 is the same as for Option 1 and higher than for Options 3 and 4. As noted for Option 1, reducing stock size to very low levels can have irreversible effects on the stock, ecosystem, and other species. The bluenose stock has not previously been known to recover from either the current or lower levels of biomass.

Costs

64 Option 2 has the longest projected rebuild timeframe (30 – 39 years) of any of the options presented. This means the stock is likely to stay in a vulnerable state for longer (refer Table 3) and will be more vulnerable to environmental stresses or low recruitment years.

65 A longer rebuild time also results in a lower level of long-term yield as the stock remains under the target biomass for longer. This is why Option 2 has the largest potential long-term cost to the commercial sector (refer Table 3).

66 With respect to short-term costs, the expected loss of ACE revenue under Option 2 is approximately $1.76 million (see Appendix 4 for more detail). As mentioned above, the loss of ACE revenue may be offset slightly by an increase in the price of ACE.

Future considerations

67 As with Option 1, the decreases to the TACs and TACCs proposed under Option 2 are likely to result in changes to fishing practices and may affect the ability to monitor the fishery effectively.

68 The risk that, as the stock begins to rebuild, the amount of bluenose taken as bycatch may exceed the current TACCs in some QMA's is also still present under Options 2. This is most likely to occur in BNS 2 where the level of bycatch recorded between 1994/95 and 2004/05 is very close to the TACC for BNS 2 (see Appendix 3).

Option 3

69 Option 3 seeks to reduce catch by the same amount as Option 1 but does so using three approximately equal cuts over three years (refer Table 7). This stepped approach seeks to reduce short-term social, cultural and economic impacts on the commercial sector.

70 The Ministry notes the Minister can only at this time make a decision about the TACs and sector allowances for the 2011/12 fishing year. Future reductions set out in Table 7 are indicative of the strategy only; separate consideration will be required for each additional cut and any newly available information would be considered before a decision was made.

Table 7. The proposed total combined TACs and sector allowances under Option 3.

Year	Total Combined TACs (t)	Total Combined TACCs (t)	Total Combined Customary Māori Allowances (t)	Total Combined Recreational Allowances (t)	Total Combined Other Sources of Mortality (t)
Current Settings	2477	2325	42	63	47
2011/12	1705	1600	9	63	33
2012/13	1245	1150	9	63	23
2013/14	787	700	9	63	15

71 Under Option 3, the proposed TAC for 2011/12 is 1807 t. The proposed strategy (ie, the three consecutive cuts set out in Table 7), has a projected rebuild timeframe of 18-36 years. Table 8 sets out the TACs and sector allowances proposed for each QMA under Option 3.

Table 8. 2011/12 proposed TAC's and allowances for each QMA in Option 3.

Option	Current TAC (t)	TAC (t)	TACC (t)	Māori customary allowance (t)	Recreational Allowance (t)	Other sources of mortality (t)
BNS 1	825	526	499	2	15	10
BNS 2	958	560	522	2	25	11
BNS 3	551	490	461	2	18	9
BNS 7	96	82	75	2	3	2
BNS 8	47	47	43	1	2	1

Benefits

72 A stepped reduction in TACs and TACCs across three years, as part of a formal rebuilding plan, provides quota owners, fishing companies, and ACE holders time to plan for the change by adjusting their budgets and activities, including their ACE distribution or harvesting plans.

73 Option 3 has lower short-term costs than Options 1 and 2 (and lower first-year costs than Option 4). Under this option, fishers would be able to land 1350 t more bluenose over the next three years (worth approximately $6.3 million, based on average 09/10 port price), when compared to Option 1.

74 A stepped reduction reduces the risk that TACCs will be over-caught, as management of bycatch is less likely to be an issue in the first few years and the stepped approach provides time to plan for the change.

Costs

75 The costs of Option 3 are similar to those described for Option 1, as the target TAC level is the same. The key difference relates to the predicted timeframe until stock size reaches B_{TGT}, which is longer than Option 1. The projected rebuild timeframe under Option 3 is 18-36 years. The wide range indicates a high level of uncertainty in how biomass will change under the proposed rebuild plan. If the stock does take up to 36 years to rebuild, commercial catch levels will remain at low levels for a long period. The economic cost of a longer period of low catches may offset the short-term benefits derived from a stepped approach to reducing the TACs and TACCs.

Future considerations

76 The future considerations for Option 4 are the same as for Option 1, as the TAC and sector allowances would ultimately be reduced to the same level.

Option 4

77 Option 4 seeks to achieve the same rebuild timeframe as Option 1 but spreads the reductions to the TACs and TACCs over five years to reduce short-term social, cultural and economic impacts on the commercial sector (refer Table 9).

78 The Ministry notes the Minister can only at this time make a decision about the TACs and sector allowances for the 2011/12 fishing year. Future reductions set out in Table 9 are indicative of the strategy only; separate consideration will be required for each cut and any newly available information would be considered before a decision was made.

Table 9. The proposed total combined TACs and sector allowances under Option 4.

Year	TAC (t)	TACC (t)	Māori customary allowance (t)	Recreational Allowance (t)	Other sources of mortality (t)
Current Settings	2477	2325	42	63	47
2011/12	1603	1500	9	63	31
2012/13	1603	1500	9	63	31
2013/14	1225	1130	9	63	23

2014/15	1225	1130	9	63	23
2015/16	521	440	9	63	9

79 Under Option 4, the proposed TAC for 2011/12 is 1603 t. The proposed strategy (ie, three cuts over five years as set out in Table 9), has a projected rebuild time of 16-27 years. Table 10 sets out the TACs and sector allowances proposed for each QMA under Option 3.

Table 10. 2011/12 proposed TAC's and allowances for each QMA in Option 4.

Option	Current TAC (t)	TAC (t)	TACC (t)	Māori customary allowance (t)	Recreational Allowance (t)	Other sources of mortality (t)
BNS 1	825	567	539	2	15	11
BNS 2	958	634	595	2	25	12
BNS 3	551	259	234	2	18	5
BNS 7	96	96	89	2	3	2
BNS 8	47	47	43	1	2	1

Benefits

80 The projected rebuild timeframe under Option 4 is similar to Option 1, although the timeframe range is wider indicating a higher level of uncertainty in how biomass will change under the proposed rebuild plan. A shorter rebuild timeframe is likely to result in reduced longer-term social, cultural and economic costs for all fishing sectors relative to options with longer rebuild timeframes (eg, Options 2 and 3).

81 A stepped reduction in TACC across five years, as part of a formal rebuilding plan, provides quota owners, fishing companies, and ACE holders time to plan for the change by adjusting their budgets and activities, including their ACE distribution or harvesting plans. Industry representatives indicate this five-year option would also:

- provide time to consider what additional research can be financed to reduce uncertainties in the stock assessment model and enable stock status to continue to be monitored robustly; and,

- reduce the likelihood that the existing CPUE series will become unreliable, by reducing the speed and extent of changes to fishing practice.

82 Overall, Option 4 is projected to have the lowest short-term costs to the commercial sector (refer Table 3). Under Option 4, the commercial sector would be able to land an additional 3600 t over the next five years (worth ~ $16.8 million in landings revenue, based on average 09/10 port price), when compared to Option 1. Long-term costs are similar to Option 1 and less than Options 2 and 3.

83 Under Option 4, the TAC's in BNS 7 and BNS 8 would not be reduced in 2011/12 therefore commercial fishers in these QMAs would not be as immediately impacted by the cuts.

Costs

84 Despite having a similar rebuild timeframe as Option 1, Option 4 is a slightly riskier option from a sustainability perspective because stock size is projected to: (i) fall to a lower level

(13.8%B_0 versus 14.5%B_0 under Option 1); (ii) potentially continue to decline for a longer period (range is 2-6 years versus 1-5 under Option 1); and, (iii) potentially remain below the soft limit for longer (range is 0-10 years versus 0-7 under Option 1). The bluenose stock has not previously been known to recover from either the current or lower levels of biomass.

85 The total combined TACC indicated for 2015/16 is 440 t, which is less than current levels of bluenose bycatch (refer Appendix 3; five year average bycatch level = 545 t). Option 4 would therefore have a more wide-ranging impact on the commercial sector than any of the other options, as it would affect fishers whose primary targets are other fisheries but who take bluenose as a bycatch. The probable impact on bycatch fisheries means there is a higher risk of over-catch and misreporting in the fishery post 2015/16 unless fishing technologies were effective at avoiding bluenose. Any over-catch of the TACCs is likely to result in a longer than projected rebuild timeframe.

Future considerations

86 Despite the staged reductions, there is still a risk that fishing practices will change enough to disrupt the CPUE series and affect our ability to effectively monitor abundance.

Other Management Measures

Recreational Bag Limits

87 The current recreational allowances for bluenose are based on 2000/01 estimates of recreational catch. Anecdotal information from Recreational Forum members suggests recreational fisher interest in bluenose has increased in recent years.

88 Current recreational daily bag limits for bluenose are based on a mixed bag of species, rather than having been set specifically for bluenose. The mixed bag limit is 20 finfish per person per day in the Northern, Central and Challenger management areas and 30 finfish per person per day in the South East, Southland and Fiordland management areas. Available anecdotal information supplied from boat ramp surveys and fisheries officer, indicates that fishers land, on average, approximately 2-5 bluenose per person.

89 Several Recreational Forum members have expressed a concern for bluenose sustainability and indicate they consider the current bag limit to be too high. The Fiordland Marine Guardians are currently submitting on a proposal to reduce the bluenose recreational bag limit to five in the Fiordland management area.

90 Given the current state of the bluenose stock, the Ministry considers it appropriate to set a bag limit likely to constrain recreational catch to within the current recreational allowances set for bluenose. However, the relationship between bag limit reductions and the recreational allowance is uncertain. This is because information on total and individual harvest levels is low. Consequently, it is difficult to assess the bag limit reduction likely to translate to a specific tonnage of total recreational catch. The Ministry proposes setting a daily bag limit of five fish per person per day for all management areas. The proposed bag limit of five bluenose reflects current available information on individual catch levels and what is considered by many to represent a “reasonable” daily bag; a bluenose weighs around 5-6 kg therefore a bag limit of five fish is likely to provide a more than adequate volume of food for fishers to take home.

91 Changing the bag limits for bluenose requires a regulatory change. If adopted, the change would not be achieved in time for the start of the 2011/12 fishing year but would be implemented during 2012.

Deemed Values

92 The Ministry is consulting on changes to deemed value rates for a number of fisheries, including bluenose. The Ministry is proposing to change the current bluenose settings to provide increased incentives to balance catch with ACE post the reductions to catch limits. For further information, please refer to the *Deemed Value* IPP.

Conclusions

93 The combined TACs for the bluenose QMAs are considered to be unsustainable; when assessed as a single biological stock, B_{CURR} is below B_{TGT} and projected to continue to decline under the current TACs.

94 The Ministry is seeking tangata whenua and stakeholder views on four management options; all of the management options seek to rebuild the stock to B_{TGT} but each addresses social, cultural and economic impacts through a different approach to managing the way and rate of rebuild. No status quo option is included as, under current TACs, stock size is projected to decline and fall below the hard limit within five years.

95 All of the options propose that the commercial sector bear the bulk of the cuts to TACs through cuts to TACCs for BNS 1, 2, 3, 7 and 8. Reductions to customary Maori allowances and the allowances for other sources of fishing-related mortality are proposed but these reductions reflect new information (customary Maori allowances) or the proposed reduction to the TACCs (other sources of mortality).

96 No changes to recreational allowances are proposed but reductions to the recreational bag limits for bluenose are discussed. The intent of the bag limit cut is to constrain catches to current levels.

97 Information on many aspects dealt with in the IPP is uncertain, for example tangata whenua usage of customary permits to harvest bluenose, harvesting levels by individual recreational fishers and the probable social, cultural and economic impacts of the proposed cuts on individual fishers or companies. The Ministry invites tangata whenua and stakeholders to provide additional information on these or other matters discussed in this IPP for consideration.

Appendix 1 - Stock Assessment Uncertainties

The stock assessment model contains a number of assumptions which affect the potential accuracy of the models outcomes. The model used in the stock assessment incorporates the following assumptions:

Bluenose is a single stock

- The close coincidence between trends in the indices for all bluenose fishstocks led the AMP Working Group to conclude that bluenose may constitute a single New Zealand-wide stock.
- There is not conclusive evidence that bluenose is a single stock. However there is no evidence which makes the hypothesis less plausible.
- Alternative stock hypotheses have not yet been thoroughly explored; however it is likely that the alternative stock hypotheses, such as the division of NZ bluenose into west and east coast stocks, would result in a more pessimistic view of overall stock status.

Standardised catch per unit effort (CPUE) is a reliable index of abundance.

- CPUE indices were accepted as abundance proxies by the Northern Inshore Working Group.
- The possibility that there was a non-linear relationship between longline CPUE and abundance was explored (possibly caused by hyper stability). Preliminary modelling found a non-linear relationship did not improve the fit to the CPUE indices.
- The uncertainty of the CPUE indices should be considered when analysing the predictions of change in stock biomass, however the uncertainty does not represent a challenge to the fact that bluenose biomass has declined.

The values of the parameter inputs are correct

- Researchers explored the sensitivity of the model was to uncertainties in input parameters. The projections of the model were largely insensitive to variation in catch history. The model results were strongly influenced by the choice of value for natural mortality (m) and steepness of the stock-recruit curve (h).
- To address uncertainty in estimates of these parameters, the model used a range of values which incorporate the range of plausible values as advised by the stock assessment working group.

There is no spatial variation in biological parameters (e.g., growth, age-at-maturity)

- Catch at age data are limited, but suggest that the composition of catches can vary significantly on small spatial and temporal scales.
- The model does not incorporate this level of complexity in spatial variation. Given the current limited data it is hard to assess how much difference the incorporation of this complexity might make to the model outcomes.

Based on this analysis, the stock assessment is considered to provide the best available information on stock status and how future stock biomass is expected to change under different catch levels.

Appendix 2 – Stock Assessment Input Values

A range of TACC's is given as the TACC estimated depends on the values of natural mortality (m) and steepness of the stock recruit relationship (h) entered in to the model. The range of parameters is agreed by the Stock Assessment working group as representative of the likely range that natural mortality and steepness for bluenose fall into.

T_{min} and therefore the predicted rebuild time, also varies under different values of these biological parameters.

The projection figures show 6 projections for each of the combinations of m and h. The table below shows which line colour refers to which combination:

Table 11. The axes give the range of biological parameters h and M entered into the model. The colours in the table show which line represents each combination of h and M in figures 3-6.

		Steepness of stock recruit relationship (h)	
		0.75	0.90
Natural mortality (M)	0.06		
	0.08		
	0.10		

Table 12. The axes give the range of biological parameters h and M entered into the model. The values in the table are maximum commercial catch (t) that would allow biomass[5] to rebuild to B_{TGT} within $2xT_{min}$.

		Steepness of stock recruit relationship (h)	
		0.75	0.90
Natural mortality (M)	0.06	600	720
	0.08	570	770
	0.10	600	840

[5] Stock spawning biomass

Table 13. The axes give the range of biological parameters h and M entered into the model. The values in the table are the number of years before biomass[3] reaches B_{TGT} under the TACC's given in Table 12. These are equal to $2xT_{min}$.

		Steepness of stock recruit relationship (h)	
		0.75	0.90
Natural mortality (M)	0.06	26	24
	0.08	26	24
	0.10	22	20

Table 14. The axes give the range of biological parameters h and M entered into the model. The values in the table are maximum commercial catch (t) that allow biomass[6] to rebuild to at least B_{TGT} within $3xT_{min}$.

		Steepness of stock recruit relationship (h)	
		0.75	0.90
Natural mortality (M)	0.06	780	930
	0.08	770	980
	0.10	810	1050

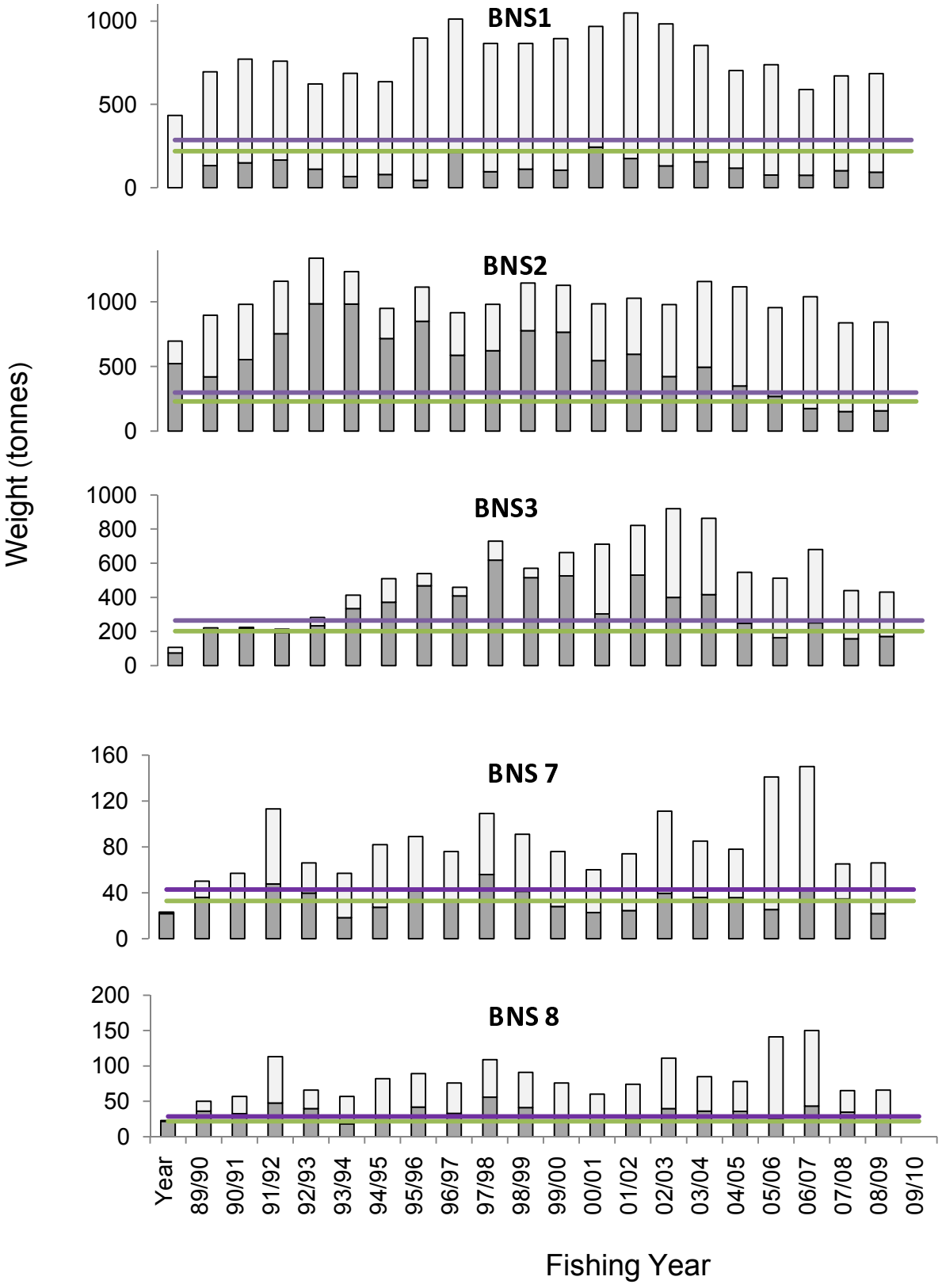
Table 15. The axes give the range of biological parameters h and M entered into the model. The values in the table are the number of years before biomass[3] reaches B_{TGT}, under the TACC's given in Table 14. These are equal to $3xT_{min}$.

		Steepness of stock recruit relationship (h)	
		0.75	0.90
Natural mortality (M)	0.06	39	36
	0.08	39	36
	0.10	33	30

[6] Stock spawning biomass

Appendix 3 - Bycatch

This data has been extracted from the bluenose characterisation report accepted by the Stock Assessment Working Group. The bars shows the weight of bluenose caught commerically as either target (light grey) or bycatch (dark grey). The lines shows the TACC (t) under Option 1 (green) and Option 2 (purple).



Appendix 4 – Socio-Economic Information

The nature of the economic impact to each fishery will partly depend on the characteristics of the fishery such as:

- The value of bluenose associated with each fishery (e.g., port price, export price and ACE price)
- The total number of fishers involved in the fishery
- The number of fishers that own quota vs. number that lease ACE
- Proportion of fishers that depend on bluenose landings (i.e., bluenose makes up the majority of their catch)

Table 16. Variation in economic indicators in last three fishing years.

	Ace Price ($ per kg)		Port price ($ per kg)	
	Min	**Max**	**Min**	**Max**
BNS1	1.46	1.92	4.70	4.73
BNS2	2.16	2.30	3.74	5.27
BNS3	0.79	1.07	3.74	4.73
BNS7	0.90	1.26	2.52	4.73
BNS8	0.88	1.19	3.74	4.73
Average	1.27	1.50	3.69	4.69

Table 17. Summary of loss of landings revenue in 2011/12. The change in landings is calculated as the difference between average catch between 07/08 and 09/10 and the proposed TACC's for 2011/12.

	Loss of landings revenue (based on 09/10 port price)			
	Option 1	Option 2	Option 3	Option 4
BNS1	-1,933,626	-1,640,366	-599,766	-410,566
BNS2	-3,658,422	-3,310,602	-2,103,772	-1,719,062
BNS3	-1,451,320	-1,181,710	-221,520	-1,295,230
BNS7	-347,746	-305,176	-149,086	-82,866
BNS8	-85,460	-57,080	13,870	13,870
Total	-7,476,574	-6,494,934	-3,060,274	-3,493,854

Table 18. Summary of loss of ACE revenue

	Loss of ace revenue (based on 09/10 ACE price)			
	Option 1	Option 2	Option 3	Option 4
BNS1	-4,914,098	-4,351,039	-2,353,087	-1,989,823
BNS2	-10,533,125	-9,733,139	-6,957,430	-6,072,597
BNS3	-2,096,294	-1,807,811	-780,408	-1,929,278
BNS7	-572,375	-518,737	-322,063	-238,626
BNS8	-149,378	-115,606	-31,175	-31,175
Total	-18,265,269	-16,526,331	-10,444,162	-10,261,498

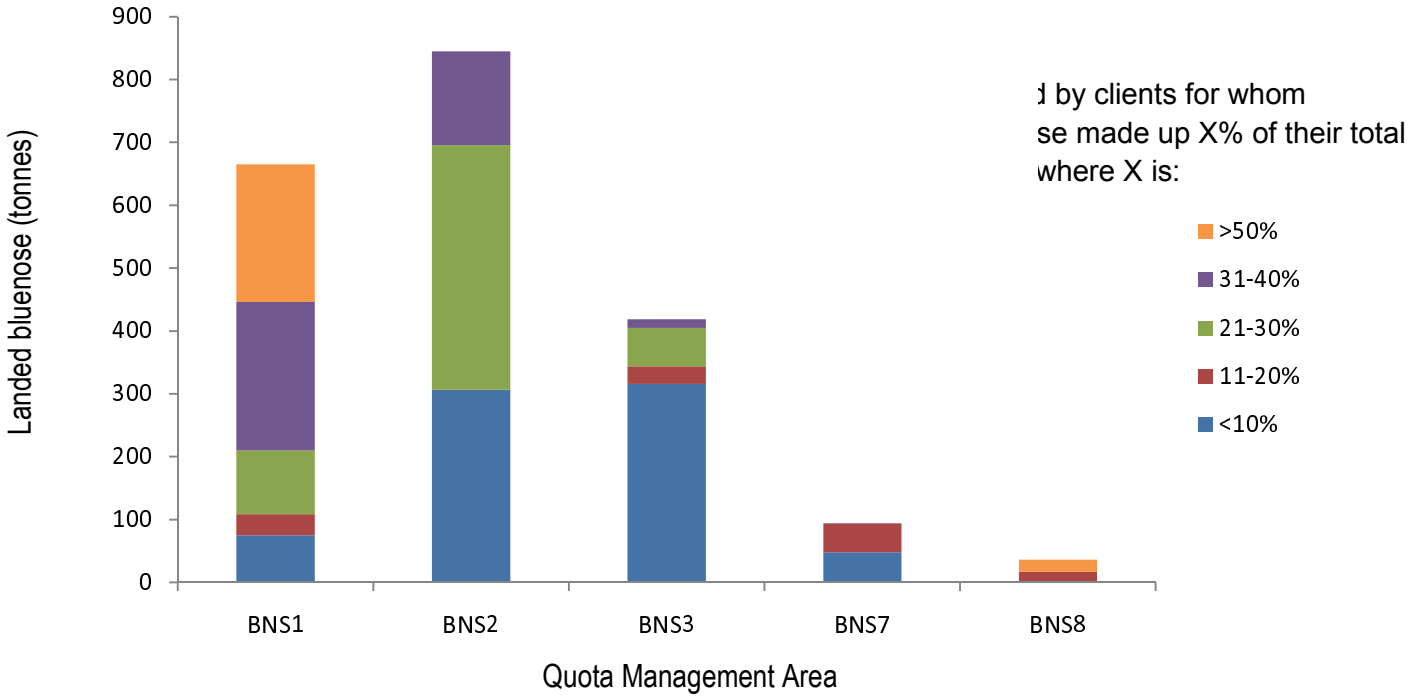
Table 19. Summary of annual export of bluenose. Note the years relate to the financial year running from 1 June to 30 May.

Year	Export Volume (kgs)	Export Value ($NZ)	Export Price ($NZ/kg)
2006/07	1,413,869	$13,094,535	$9.26
2007/08	1,354,809	$14,464,147	$10.68
2008/09	1,261,297	$14,444,121	$11.45
2009/10	1,106,345	$12,801,484	$11.57
2010/11	1,067,302	$12,639,502	$11.84

Table 20. Characteristics of each QMA bluenose fishery.

	Commercial catch (t)	No. of vessels (No. of long line vessels)	No. of quota holders	No. of ace holders (no. that hold quota)
BNS1	665	31(27)	41	46 (6)
BNS2	845	31 (22)	51	42(8)
BNS3	419	27 (15)	78	46 (7)
BNS7	94	12 (9)	72	28 (3)
BNS8	36	5 (3)	51	4 (0)

Figure 21. The proportions of bluenose landed by clients for whom bluenose makes up varying proportions of their total landed catch. For example, BNS 1 has the most amount of bluenose landed by clients for whom bluenose makes up over 50% of their total landed catch.



In summary;

BNS 1: Over half of the bluenose caught from BNS 1 is caught by fishers for whom bluenose made up between 30 to 40% (n = 5) or over 50% (n = 7) of their total landed catch. It is likely the TACC reductions will have the largest impact on individual fishers in BNS 1.

BNS 2: Some of the fishers for whom bluenose represent 30 to 40% of their catch, fish in both BNS 1 and BNS 2 (n = 4). Therefore the TACC reductions are also likely to impact individual fishers in this area.

BNS 3: The vast majority of fishers catching bluenose from this area do not appear to rely on bluenose landings solely for income, as bluenose represents on average 3% of their total landed catch. This may imply that fishers operating in this area are more able to adapt their fishing practices to mitigate the economic impact of the proposed TACC reductions.

BNS 7 & 8: There are a couple of fishers who may rely partly on bluenose landings from these areas (as well as from BNS 1 and 2), however due to the low current levels of bluenose landings reported to BNS 7 and 8 the economic impact is likely to be considerably smaller for these areas compared to BNS 1, 2 and 3.