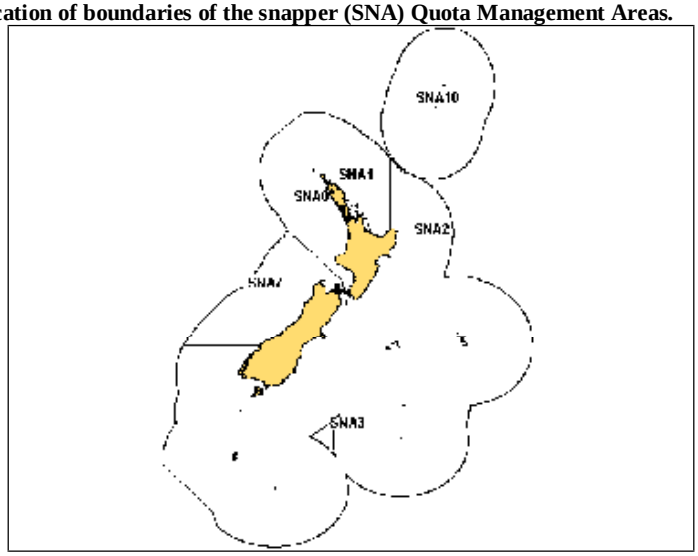
SNAPPER (SNA 8)

Figure 1: **Location of boundaries of the snapper (SNA) Quota Management Areas.**



Key Issues to be Considered

1 The key issues to be considered for SNA 8 are as follows:

a) The Total Allowable Catch (TAC) for SNA 8 is set under s 13 of the Fisheries Act 1996. There is a requirement to maintain the biomass of any fishstock managed under s 13 at a target stock level, being at, or above, a level that can produce the maximum sustainable yield (B_{MSY}). If below B_{MSY}, the Minister must take measures to restore the biomass to, or above, this level.

b) In 1998 the Minister of Fisheries set a TAC for SNA 8 that was expected to allow the fishery to exceed B_{MSY} by 2008. A new assessment is now available for the SNA 8 stock. The 2005 SNA 8 stock assessment estimates the current biomass of the stock is approximately 50% of B_{MSY} (range between 38% and 62%) and 8-12% of unfished biomass.

c) Current stock modelling predicts that under the current TAC, biomass is expected to increase slowly, but will not reach B_{MSY} within the next 20 years. There is only a 48–64% chance that biomass will increase in the next five years.

d) SNA 8 is an important fishery to both recreational and commercial fishers. Accordingly, there is benefit in rebuilding the stock at a faster rate than is likely under the current TAC. The paper proposes three alternative TAC options. Each will result in greater certainty of rebuild at a faster rate than under the current TAC.

e) The key issue in considering the different TAC reductions is the benefits associated with the various rates of rebuild, relative to the socio-economic impacts of reduced catch limits.

f) Two approaches are proposed to set allowances and the total allowable commercial catch (TACC) under each TAC option. The first approach is a proportional approach, where allowances between sectors are made according to current proportions of the TAC. The second approach is a non-proportional approach based on past management action in the fishery and the perceived importance of the fishery to recreational fishers.

g) The proportional approach results in a proportional reduction to the recreational allowance and the TACC. Under the non-proportional approach only the TACC is reduced. The recreational allowance remains unchanged.

h) If the recreational allowance is reduced, a decrease in the daily bag limit may be required in order to ensure that recreational catch does not exceed the allowance. If this option is preferred, MFish has proposed to decrease the daily bag limit in the northern part of the stock[1] from 15 to ten, in line with the current bag limit of 10 for the southern part of the stock[2].

i) No reduction in recreational allowance is proposed under the non-proportional approach. However, recreational catches may increase as the SNA 8 biomass increases under this option. The Ministry of Fisheries (MFish) proposes to review recreational catch information when new survey results are available, to determine whether recreational catch remains within the allowance set. MFish considers the risk of increased recreational catch in the interim does not pose a significant threat to any rebuild strategy option.

List of Management Options

2 The following management measures are proposed for SNA 8:

a) Decrease the current TAC of 2 060 tonnes to allow the SNA 8 stock to rebuild according to one of the three options proposed in Table 1.

Table 1. Options for TACs (tonnes), TACCs (tonnes) and allowances (tonnes) for SNA 8

	Allowance Approach	TAC	Customary Allowance	Recreational Allowance	Other fishing mortality	TACC
Option 1 TAC reduction of 138 tonnes	Proportional	1 922	50	335	139	1 398
	Non-proportional	1 922	50	360	137	1 375
Option 2 TAC reduction of 275 tonnes	Proportional	1 785	50	311	129	1 295
	Non-proportional	1 785	50	360	125	1 250
Option 3 TAC reduction of 550 tonnes	Proportional	1 510	50	261	109	1 090
	Non-proportional	1 510	50	360	100	1 000

[1] The “northern part” refers to the area within SNA 8 north of Tirau Point to North Cape, where the current daily limit is 15.
[2] The “southern part” refers to the area within SNA 8 south of Tirau Point, where the daily limit is already 10.

AND

b) Reduce the amateur daily bag limit in the northern part of the stock from 15 to 10, in line with current bag limits for the southern part of the stock.

OR

c) Review the effect of increasing recreational catches on rebuild rates of the stock when better recreational catch estimates are available.

AND

d) Increase the annual deemed value of SNA 8 to $8.68, 200% of the 2004 port price, to minimise the current over catch of the TACC and to provide an incentive for fishers to land SNA 8 against annual catch entitlement (ACE).

Rationale for Management Options

3 The TAC for SNA 8 is set under s 13 of the Fisheries Act 1996. There is a requirement to maintain the biomass of any fishstock managed under s 13 at a target stock level. This target is at or above a level that can produce the B_{MSY}, having regard to the interdependence of stocks.

4 If a stock is currently below the target level specified in s 13, there is a requirement to set a TAC that will result in the stock being restored to, or above, this level. Factors that need to be considered when setting the TAC include the interdependence of stocks, biological characteristics, and any environmental factors affecting the stock. The Minister is required to have regard to any social, cultural and economic factors that he or she considers relevant in the determination of the way in which, and the rate at which the stock is moved towards B_{MSY}.

Status of the stock

5 The TAC for SNA 8 was set at 2 060 tonnes in 1998, when the Minister of Fisheries decided to set a 10-year rebuild strategy for the fishery. Allowances were also set at this time: a TACC of 1 500 tonnes; a 50 tonne customary allowance; a 360 tonne recreational allowance; and a 150 tonne allowance for other sources of fishing-related mortality. It was estimated that there was a 61% chance the stock would exceed B_{MSY} by the 2007–08 fishing year. At the time of the decision, the Minister noted that the TAC would need to be reviewed if there was a high likelihood that the fishery would not rebuild to B_{MSY} within the required timeframe (2007–08) under existing controls.

6 The 2005 SNA 8 stock assessment shows that the biomass of the stock is currently below B_{MSY}. Current biomass is approximately 50% of B_{MSY} (between 38% and 62%) and only 8–12% of virgin (unfished) biomass (B_0). It is apparent that the rebuild strategy set in 1998 has not achieved the expected results. The 2005 stock assessment estimates that while biomass should increase slowly under the current TAC, it will not reach B_{MSY} within the next 20 years. Further, there is only a 48-64% chance that biomass will increase in the next five years.

Restoring the SNA 8 stock to B_{MSY}

7 In addition to the legislative obligation to rebuild the SNA 8 stock, there are potential benefits of managing the stock at $B_{MSY.}$ Importantly, rebuilding the SNA 8 stock to B_{MSY} is likely to increase the available yield by 15-20% above the current TAC. Further, managing SNA 8 at B_{MSY} will require less frequent intervention (adjustment to TAC, allowances, other management measures), providing greater certainty for all stakeholders. Additional potential benefits are:

a) Catch rates are likely to increase as stock biomass increases, and this in turn may decrease operating costs;

b) The size of fish is likely to increase, and this in turn can decrease effort required to catch the same volume of fish;

c) Non-commercial satisfaction will increase as catch rates improve and fish size increases; and

d) There will be a reduced risk of sustainability concerns by managing the fishery at the target level.

8 Under the current TAC there is a 48-64% probability that the biomass of the stock will increase over the next five years; the biomass will not increase to B_{MSY} within the next 20 years. As noted there is no specified time period for rebuilding a population to B_{MSY}. The period chosen should be specific to the stock and take into account biology; environmental; and social, cultural and economic factors.

9 In 1998 the previous Minister specified a timeframe of 10 years for rebuild of the SNA 8 stock. However, the 10-year timeframe was within the context of a stock assessment that showed the population could rebuild without the need to reduce removals.

10 The Minister could decide to maintain the current TAC, as the stock is rebuilding slowly which meets the obligation to rebuild of stocks that are below B_{MSY}. However, the timeframe for rebuild may not be best suited to the characteristics of the fishery.

11 Snapper are an important commercial species, and a highly-valued recreational species (possibly the most important recreational species on the west coast of the North Island). Snapper are long-lived, have low natural mortality, and normally have many year classes in the population. Given the biology of snapper, consideration of environmental factors and the socio-economic and cultural value of snapper, MFish consider there is benefit in rebuilding the stock with a higher degree of certainty and over a shorter timeframe than is likely under the current TAC. MFish regard 20 years as the maximum timeframe that should be considered to rebuild the stock to B_{MSY}.

12 Within the 20 year rebuild period, the actual rebuild strategy chosen will be determined by the weight placed on socio-economic impacts associated with the various rebuild strategies. The greater the reduction to current catch, the faster and more certain the rebuild, but the greater the socio-economic impact.

13 The actual socio-economic impact is difficult to determine. In some cases it may be a short term economic impact which can be mitigated by the benefits associated with a stock managed at B_{MSY}. However, the degree to which the immediate impact of a reduction to the

TAC can be mitigated by expected increases to harvest levels in the future depends significantly on future allocation decisions and the timeframe for rebuild.

Total Allowable Catch

14 MFish considers that the probability of the current TAC moving the stock towards the target B_{MSY} level is low. Given the requirement under the Act to move the stock toward B_{MSY} and the benefits of a rebuild for this valuable fishery, a range of alternative TACs are proposed. These TACs will increase the certainty and rate of a rebuild.

2005 Stock Assessment

15 Future projections were modelled in the 2005 stock assessment in order to inform managers of the impact of possible reductions in total catch. (see results outlined in Table 2). Although the projections were run out until 2025 they are not likely to be very reliable over such a long time period. As with all stock assessments there are a number of uncertainties in the information used and a large number of assumptions required to carry out the modelling:

- Estimates of biomass from SNA 8 tagging programmes may be biased;
- Catch history for the stock is uncertain; and
- Recreational catch data used in the model is uncertain.

16 In addition, the modelling was not based on existing allowances within the TAC; recreational catch estimates used were different from the existing allowance and the customary allowance was not incorporated. Further, the projections were modelled solely on a reduction to the TACC. The implication of this is that the rebuild timeframes and probabilities presented will not be correct for all management options proposed. However, the projections do indicate the approximate timeframe for rebuild under the various options presented and MFish considers the assessment to be a good guide in the development of management options for the fishery.

Recreational catch estimates

17 Because different recreational catch scenarios were modelled in the 2005 SNA 8 stock assessment, there are a range of anticipated rebuild rates and probabilities within each TAC option proposed (Table 2). Industry and recreational fishing representatives in the Snapper Working Group were unable to reach an agreement on an acceptable estimate of recreational catch. Two models were therefore accepted, one using a recreational catch estimate of 300 tonnes, and a second using an estimate of 600 tonnes. It is possible that average recreational catches are between the two estimates.

18 Two future recreational catch scenarios were also modelled within each of the assumed recreational catch estimates (300 and 600 tonnes). The first (Frec) assumes the recreational catch is a fixed proportion of the snapper population size. In this scenario, recreational catches increase as the biomass of SNA 8 increases. The second scenario (Rcap) assumes a constant annual recreational catch, where recreational catches are maintained at current levels.

19 The Snapper Working Group agreed that recreational catch is likely to increase as the stock rebuilds. Increased participation in the fishery as the human population grows is also likely

to result in increasing recreational catch. While it was agreed that recreational catches could increase in the future, the Snapper Working Group could not anticipate the size of this increase. Both scenarios (Frec and Rcap) are therefore best used as a guide, or range, to highlight the long-term implications of future recreational catches on the choice of rebuild strategy adopted.

Table 2. **Short-term and long-term projections for the SNA 8 stock under different catch reduction options. Two recreational catch estimates have been used (300t and 600t), and two future recreational catch scenarios (Rcap and Frec).**

TACC Scenario (currently 1500 tonnes)	Recreational catch estimate	Estimated year to reach B_{MSY}		Probability that biomass at 2025 is greater than B_{MSY} (%)		Probability that biomass in 2010 is greater than biomass in 2005 (%)	
		Rcap*	Frec**	Rcap	Frec	Rcap	Frec
1 375 tonnes	300	2021	> 2025	65	44	74	75
	600	>2025	> 2025	43	13	64	59
1 250 tonnes	300	2018	2022	81	64	84	83
	600	2020	> 2025	68	29	73	71
1 000 tonnes	300	2014	2016	97	95	94	96
	600	2016	2021	92	72	88	90

***Rcap = recreational catch constrained at current catch**
****Frec = recreational catch proportional to stock biomass (increases as stock increases)**

Total Allowable Catch options

20 In order to rebuild the biomass to B_{MSY} within the twenty year time period outlined above, three rebuild options spanning a range of reductions in the TAC have been proposed (Table 1). The key issues in considering TAC options include the benefits of managing at the target stock level and the degree of certainty and rate of rebuild required, taking into account the socio-economic impacts of change. The options balance rate of rebuild with socio-economic impact. Option 1 places greatest weight on the immediate socio–economic impacts. Option 3 places greatest weight on the rebuilding the stock and the potential longer term socio-economic benefits associated with this rebuild.

21 The options are discussed in more detail below.

Option 1

22 It is proposed to reduce the TAC from 2 060 to 1 922 tonnes, which is a reduction of 138 tonnes.

23 Under this option, the probability of an increase in biomass by 2010 ranges between 59% and 75%, depending on recreational catches (Table 2). This probability is not considered to be high because there is more than a one in four chance that biomass in 2010 will not exceed the current level.

24 It is projected that a TAC reduction of 138 tonnes should result in the stock rebuilding to B_{MSY} between 2021 and sometime after 2025. However, there is little chance that the SNA 8 biomass in 2025 will exceed B_{MSY} (probability = 13-65%).

25 While this option will result in an increase in SNA 8 biomass, MFish recognises that it is unlikely that the stock will fully rebuild to the target level in the preferred 20-year

timeframe. The intent of this option is to move the stock towards the target level at a faster rate than under the current TAC; further TAC reductions may need to be considered to ensure the stock reaches B_{MSY} within the 20-year timeframe. The benefit of this approach is that the socio-economic impact of the total catch reduction can be spread over a period that allows stakeholders opportunity to adjust and plan to mitigate impacts as best as they can.

26 There are social and economic considerations associated with this option. As the option represents the least catch reduction it will minimise any adverse social and economic impacts in the short term while still allowing the stock to rebuild. However, the option will be the slowest to achieve the social and economic benefits of managing a stock at or above B_{MSY}. Further, the B_{MSY} target may not be achieved within a timeframe considered reasonable based on the characteristics of the fishery. A more detailed description of the social and economic impacts of this option is contained in the allowances section below.

Option 2

27 It is proposed to reduce the TAC from 2 060 to 1 785 tonnes, which is a reduction of 275 tonnes.

28 Under this option there is a 71% to 84% probability that the biomass of SNA 8 in 2010 will be higher than current levels (Table 2). Therefore, there is a higher probability of a short–term increase in biomass in this option than in option 1.

29 In the longer term, it is expected that the stock should reach B_{MSY} between 2018 and some time after 2025. There is a greater probability (29 – 81%) in this option than in option 1 that biomass in 2025 will exceed B_{MSY}.

30 There are social and economic considerations associated with this option. Short-term socio–economic costs will be higher than in option 1 because the level of current removals is being reduced by an additional 137 tonnes. However, the stock is likely to rebuild more quickly under this option. A quicker rebuild provides the opportunity for benefits of management at or above B_{MSY} to be obtained more quickly than under option 1. As for option 1, a more detailed description of the social and economic impacts is contained in the allowances section below.

Option 3

31 It is proposed to reduce the TAC from 2 060 to 1 510 tonnes, which is a reduction of 550 tonnes.

32 Under this option, the probability of an increase in biomass by 2010 is higher than in all other options proposed, ranging between 88% and 96% (Table 2).

33 In the long-term, it is projected that a TAC reduction of 550 tonnes would allow the stock to reach B_{MSY} between 2014 and 2016, a rebuild timeframe of as little as 10 years.

34 There are likely to be considerable social and economic considerations associated with this option. A 550 tonne reduction to current levels of removals will have multi-million dollar impacts regardless of allocation decisions. More detailed information on the socio-economic impacts is outlined in the allocation section.

35 Despite the immediate socio-economic cost, this option is likely to achieve the advantages of a stock at B_{MSY} sooner and with greater certainty than the other options. Accordingly, some of the short-term impacts may be offset by the more rapid increase in biomass that would allow catches to be increased in future. Again the degree of benefit obtained to offset the immediate loss will depend on the actual timeframe for rebuild, as well as future allocation decisions.

Setting Allowances

36 Under s 21 of the Act, the Minister sets various allowances for sector groups' catches, plus any other sources of fishing-related mortality, within the TAC. However, s 21 of the Act does not provide specific guidance on how the Minister should distribute the TAC between sector groups about either the quantities that they could receive, or whether there should be any prioritisation of allowance.

37 The Minister has broad discretion about allocation. Subject to constraints provided in the Act, the Minister is able to take into account any factors considered relevant to the allocation decision, and determine the appropriate weight to be placed on such factors. The Minister needs to make an assessment as to the competing needs of the sector groups for a limited resource and have regard to the relevant social, economic and cultural implications when making a decision.

38 MFish has set out a list of factors that it considers relevant to the allocation decision in the Statutory Considerations and Policy Guidelines section of the IPP. In addition, MFish has been guided by judicial decisions that consider the issue of allocation of the TAC. In particular, the courts have identified that:

- All stakeholders' demands for a stock need to be considered;
- The needs of any particular sector do not need to be fully provided for when specifying an allowance;
- The existing ratio between commercial and recreational interests can be varied;
- Where commercial landings are reduced for sustainability reasons, reasonable steps should be taken to avoid the reduction being made less effective because of increased fishing by non-commercial stakeholders; and
- In the case of competing demands it may be reasonable for recreational fishers to share some of the "pain" from a reduction in the TAC.

39 In order to aid decision making in developing advice on allocation options in kingfish, MFish categorised the range the factors the Minister could take into account into two broad policy frameworks -claims and utility. The statutory consideration section of the IPP outlines these approaches in more detail. In summary the two approaches are:

a) A claims-based approach, where allowances are based on consideration of the legitimacy of claims to the resource. Generally these claims are based on present or historical association with the resource, giving rise to expectations on the part of fishers (or classes of fishers) with respect to on-going future involvement.

b) A utility-based approach, where allowances are based on the utility (or level of well being) that would result from the allowance made to a particular fishing sector.

This approach tends to give a higher priority in allowance setting to those sectors who value the resource most. Value can include both economic and non-economic values.

Claims-based approach

40 The Minister has discretion in setting allowances within a TAC. However, case law considers that it is not unreasonable for commercial and recreational fishers to share some of the "pain" from a reduction in the TAC. There is no requirement that the interests of recreational or commercial fishers must be fully provided for.

41 The SNA 8 fishery is a "shared" fishery. There is a significant level of removals from both non-commercial and commercial sectors. The level of recreational catch is uncertain. Best available information suggests that the recreational sector take, on average, 20% of total take from the fishery (ranges between 15 and 30%). Because removals are substantial, MFish consider that it is reasonable to propose options where the recreational sector shares in the rebuild of the fishery.

42 The SNA 8 TAC was set in 1998. Within the TAC, allowances were set for each stakeholder group and for other sources of mortality. In a claims-based approach to setting allowances for SNA 8, allowances for the recreational and commercial sector would be adjusted proportionally by the amount of the TAC reduction. The effect would be to ensure that relative proportions of the TAC for each of these sectors did not change.

43 The effects of proportionally allocating the TAC on the rebuild timeframe and associated probabilities have not been modelled in the SNA 8 2005 stock assessment. The model was based on a reduction to the TACC only. While the reduction in total removals will be the same under both approaches, it is not known whether changing the proportions removed from different sectors will have an impact on the rebuild projections (e.g. as a result of the effect of differences in gear selectivity between sectors on size distribution of fish taken).

Utility-based approach

44 The Fisheries Act assigns no priority between commercial and recreational interests. An alternative to the claims-based approach noted above is to set allowances based on relative value of the resource to each sector. The objective of such an approach would be to maximise the value of harvest from the fishery by allocating allowances that allow this to occur. Market based mechanisms are best at achieving value maximisation because trade between sectors will ensure optimal allocation. However, in the absence of a market based mechanism, maximised value is achieved by the decision maker setting allowances for each sector that enable each sector to maximise their utility.

45 In the absence of a market in tradeable rights to the SNA 8 resource that encompasses all sectors, there is a great deal of uncertainty regarding relative value of the SNA 8 fishery. The results of a survey by the South Australian Centre for Economic Studies[3] (SACES) produced estimates of the value of the recreational fishery for SNA 8 based on non-market estimation techniques (contingent valuation to determine the willingness of a fisher to pay

[3] The South Australian Centre for Economic Studies (1999) Value of New Zealand Recreational Fishing Project: REC 9801.

to catch a snapper). These results were used to estimate the value of the recreational fishery based on the 1996 estimate of recreational catch of 236 tonnes.

46 MFish considers that the best comparative measure of recreational value is determined from the marginal willingness to pay (the change in willingness to pay with respect to a unit change in the amount of fish caught and kept). Using the estimates provided by SACES of a marginal willingness to pay of $5 790 per tonne and capitalising this amount at 10% provides an estimate of recreational value of SNA 8 at $57 900 per tonne. These results highlight that SNA 8 is a high-value fish stock for recreational fishers.

47 Commercially caught snapper is also a high-value species. Snapper traded price is approximately $42 550 per tonne ($90^{th}$ percentile for transactions from 1 October 2001).

48 No information is available to determine how the relative values (commercial and recreational) will change as relative shares of the resource are increased or reduced. In this context utility information can only be considered as a guide to allowance setting and cannot be used to determine an optimal allocation of shares in the fishery.

49 Information on utility is highly uncertain due to:

a) Uncertainty in the method used to calculate recreational value (contingent valuation);

b) Uncertainty around how values may have changed since the time the recreational survey was undertaken in 1999;

c) Uncertainty in how commercial and recreational values will change in response to increasing or decreasing allowances.

50 The quantative assessment of relative value between the commercial and recreational sector do not indicate a sufficient difference to guide allocation decisions given uncertainty in information.

51 The uncertainty in the utility approach needs to be taken into account when weighting is placed on utility information in the setting of allowances. However, despite uncertainty in information MFish consider that utility information is the best available information to provide some guide on relative values in the fishery.

Other matters

52 MFish notes that the claims and utility based frameworks are policy constructs and do not limit the Minister's broad discretion when making a decision on allocation. The Minister may take into account a combination of value and historical catch information, or other relevant factors including views of submitters.

53 Recreational fishers have indicated that the SNA 8 fishery is of considerable social and cultural value. Snapper are probably the most highly sought after recreational species on the west coast of the North Island. Recreational representative groups have expressed concern at reduced catch rates in the fishery and have expressed a desire that catch rates and opportunities for catching snapper are improved as rapidly as possible. They believe they have been disadvantaged by previous Government decisions that they consider allowed the commercial sector to over utilise the resource.

54 Recreational fishers also note that they have already been subject to a number of management changes made in an attempt to reduce recreational effort in the SNA 8 fishery. These are:

a) Bag limit reductions in 1985, 1993 and 1995;

b) An increase in the minimum size limit from 25 to 27cm in 1994; and

c) A reduction in the number of hooks allowed on long lines from 50 to 25 in 1994.

55 As a result of these changes, recreational fishers feel that they have already been contributing to the attempted rebuild of the fishery.

56 Having regard to the factors noted above, the Minister could decide to provide preference to the recreational sector over the commercial sector. MFish has outlined an alternative non–proportional allocative option below based on not adjusting the recreational allowance.

Compensation

57 Setting a TAC is a sustainability measure made under s 11 of the Fisheries Act 1996 (the Act). Section 308 of the Act explicitly protects decisions made under s 11 of the Act from compensation claims.

58 Decisions on TACCs and allowances are made pursuant to s 21 of the Act. No protection is provided by s 308 of the Act for decisions made under s 21 apart from the circumstance of the initial introduction of a species into the QMS. This does not in itself suggest that there is a liability for compensation; any compensation claim would still need to be made out to the satisfaction of the Courts if legal action ensued.

Allowance Options

59 The Minister is required to make separate decisions on allowances and TACCs for the SNA 8 stock. MFish proposes allowances and TACCs within each TAC option as shown in Table 1. The proportional allowance approach is based on the information provided in the claims-based approach discussed above. The non-proportional allowance approach is based on the information provided in the other matters section discussed above, should the Minister choose to give greater weight to this information.

Customary Allowance

60 The current customary allowance is 50 tonnes, which was set in 1998. No changes to the current customary allowance are proposed.

61 There is an on-going obligation under the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992 to give recognition to the use and management practices of Maori in the exercise of non-commercial fishing rights. There is a requirement to act consistently with that Act when making decisions under the Fisheries Act. MFish proposes that no changes be made to the current customary allowance in all three options presented. The exercise of fishing rights in accordance with traditional customs is seen as the most important element of non–commercial fishing rights for Maori.

62 When the allowance was set in 1998, no customary catch estimates had been made for the whole stock, and no estimates are included in the stock assessment. No new information is available. MFish does not consider that customary catch exceeds the current allowance. MFish invites stakeholders to provide further information on customary catch estimates on the west coast of the North Island.

63 The proposal to reduce the TAC so that the SNA 8 fishery can rebuild should have positive implications for customary fishers, by increasing the availability of snapper. The first option will result in the slowest improvement in customary fishing for snapper. The other two options, which involve larger TAC reductions, could be expected to bring progressively greater improvements in customary fishing within shorter timeframes.

Other Fishing–Related Mortality

64 The SNA 8 stock assessment model allows for a 10% level of other sources of fishing mortality based on commercial catch limits. Other fishing mortality includes high-grading of catches and illegal catches (see Annex One for further details). The TAC allowance for other fishing mortality reflects this and is currently 150 tonnes, 10% of the 1 500 tonnes commercial catch limit.

65 In all three options proposed, the allowance for other sources of mortality is retained at 10% of the TACC for each option.

Total Allowable Commercial Catch

66 The economic effect on commercial interests of decreasing the TACC is not fully known. Commercial impacts can be measured as direct opportunity costs.

67 MFish considers that commercial impacts can begin to be measured by change to total asset value and by foregone annual earnings as provided by the port price of snapper. MFish notes that port prices will overestimate annual earnings because they do not allow for handling costs. The relative change to the quota value is unknown. For example, in the hoki fishery the quota value continued to increase despite dramatic reductions in the TACC. Instead, the short-term impacts on quota owners can be measured by the value and availability of ACE. Table 3 shows the foregone ACE and catch earnings estimated under all options.

68 Decreasing the TACC is also likely to cause indirect, or downstream, impacts in addition to direct economic impacts. For example, a reduction may impact related industries such as processing and transport services. A reduction may also impact on coastal communities that are dependant on the inshore fishing industry. Lastly, a reduction may affect associated fisheries. Target trevally (TRE 7) and red gurnard (GUR 1 and GUR 8) fisheries often catch SNA 8 as bycatch. A decrease in available ACE may have an adverse effect on fishers needing to acquire ACE to cover SNA 8 caught as bycatch in these fisheries. A reduction in the SNA 8 TACC may act to constrain catches of these stocks.

69 There are likely to be longer-term gains under any TACC decrease. Should the stock rebuild to B_{MSY} in the projected timeframe, the TACC could be increased above the existing 1 500 tonnes, to reflect the increased stock biomass. An increase in stock biomass is also likely to improve catch rates and increase the size of fish caught, all of which may decrease operation costs. The quota value should also increase as the stock biomass improves.

Table 3. Assessment of potential loss of economic return for all TACC options.

	Allowance Option	TACC (tonnes)	TACC reduction (tonnes)	Foregone catch earnings ($)	Foregone ACE value ($)*
Option 1	Proportional	1 398	102	442 680	408 000
	Non-proportional	1 375	125	542 500	500 000
Option 2	Proportional	1 295	205	889 700	820 000
	Non-proportional	1 250	250	1 085 000	1 000 000
Option 3	Proportional	1 090	410	1 779 400	1 640 000
	Non-proportional	1 000	500	2 170 000	2 000 000

*Based on a 90th percentile value of $4.00 per kg

Option 1

70 This option will have the least impact on the commercial sector, because it proposes the smallest TACC reduction. It is recognised that any reduction in the SNA 8 TACC will have a significant social and economic impact on this sector, both through direct financial losses and impacts on associated fisheries. The main rationale for this option is that it offers a prospect for some rebuilding to occur, while minimising adverse socio-economic impacts.

Proportional allowance

71 Applying this approach in option 1, it is proposed to reduce the TACC from 1 500 to 1 398 tonnes, a reduction of 102 tonnes.

72 This approach will have the least impact on asset value and annual earnings (Table 3). Foregone catch and ACE earnings are estimated to be $442 680 and $408 000 respectively under this option.

Non-proportional allowance

73 Applying this approach in option 1, it is proposed to reduce the TACC from 1 500 to 1 375 tonnes a reduction of 125 tonnes. This reduction is only marginally higher (23 tonnes) than the proportional allowance approach under option 1 and as a result, impacts of this approach will be similar. Foregone catch and ACE earnings are estimated to be $542 500 and $500 000 respectively (Table 3).

Option 2

74 The TACC reductions proposed in option 2 are larger than those proposed in option 1. As a result, immediate impacts of this option on the commercial sector are expected to be more substantial.

75 Long-term economic gains under this option will be achieved faster than under option 1. It is expected that the stock will rebuild to B_{MSY} in a shorter period of time, which means the TACC could be increased sooner and catch rates will increase at a faster rate.

76 Less ACE will be available to cover SNA 8 catches in associated fisheries than in option 1.

Proportional allowance

77 Applying this approach in option 2, it is proposed to reduce the TACC from 1 500 to 1 295 tonnes, a reduction of 205 tonnes.

78 As for option 1, the full economic effect of decreasing the TACC is not known. Foregone catch and ACE earnings are estimated to be $889 000 and $820 000 respectively under this option (Table 3).

Non-proportional allowance

79 Applying this approach in option 2, it is proposed to reduce the TACC from 1 500 to 1 250 tonnes, a reduction of 250 tonnes. This is only marginally higher (45 tonnes) than the proportional allowance under option 2 and as a result, impacts of this allowance will be similar. Foregone catch and ACE earnings are estimated to be $1 085 000 and $1 000 000 respectively under this option (Table 3).

Option 3

80 The TACC reductions proposed in option 3 are more substantial than those proposed in option 1 and 2. This option will produce the fastest rebuild rate for the stock of the three options proposed. As a result, it will also have the most significant negative social and economic impacts on commercial interests.

81 Estimated economic gains that can be made under this option will be achieved over shorter period than those under options one and two. Should the stock rebuild to B_{MSY} by 2015 as projected, the TACC could be increased beyond the current level of 1 500 tonnes. Further, catch rates are likely to increase relatively quickly and this may in turn reduce fishing costs.

82 This option will have the most severe effect on associated fisheries.

Proportional allowance

83 Applying this approach in option 3, it is proposed to reduce the TACC from 1 500 to 1 090 tonnes, a reduction of 410 tonnes.

84 As with all options proposed, the full economic and social cost of this option is not known. Foregone catch and ACE earnings are estimated to be $1 779 400 and $1 640 000 respectively under this option (Table 3).

Non-proportional allowance

85 Applying this approach in option 3, it is proposed to reduce the TACC from 1 500 to 1 000 tonnes, a reduction of 500 tonnes This reduction is 90 tonnes higher than the proportional allowance and as a result, impacts are likely to be more severe. Foregone catch and ACE earnings are estimated to be $2 170 000 and $2 000 000 respectively under this option (Table 3).

Recreational Allowance

Option 1

Proportional allowance

86 Applying this approach in option 2, it is proposed to reduce the recreational allowance from 360 to 335 tonnes, a reduction of 25 tonnes.

87 The reduction in recreational allowance may result in a small increase in the rate at which the stock rebuilds to B_{MSY}. A SNA 8 rebuild will benefit recreational fishers through larger fish and higher catch rates.

88 The economic cost to the recreational sector of decreasing the allowance by 25 tonnes is uncertain and difficult to measure. Equally difficult to measure will be the social impact of a reduction in the recreational allowance. Recreational fishers currently report that they are very unhappy with the size and availability of snapper on the west coast, which they say are being adversely affected by the low stock biomass. They have noted that excessive levels of pair trawling in the 1970's impacted heavily on SNA 8 and the stock has not recovered, leading to reduced recreational access. They also note that the recreational sector has contributed to the attempted rebuild of the fishery, accepting three bag limit reductions since 1985 as well as an increase in size limits from 25 to 27 cm, which was increased for non–commercial fishers only.

Non-proportional allowance

89 Under this approach there would be no change to the current recreational allowance.

90 The benefit of this option to the recreational sector is that recreational fishers will retain their existing allowance, and will gain from any increased rebuild as a result of the reduction to the TAC.

Option 2

Proportional allowance

91 Applying this approach in option 2, it is proposed to reduce the recreational allowance from 360 to 311 tonnes, a reduction of 49 tonnes.

92 Decreasing the recreational bag limit by 49 tonnes is likely to marginally increase the rate at which benefits can be gained by the stock moving towards B_{MSY}.

93 A reduction in the recreational allowance of 49 tonnes will result in social and economic impacts to the recreational sector. As discussed in option 1, these impacts are difficult to measure and as a result remain uncertain.

Non-proportional allowance

94 MFish proposes no change to the current recreational allowance under this approach for option 2.

95 The benefit of this option to the recreational sector is that recreational fishers will retain their existing allowance, and will gain from any increased rebuild as a result of the reduction to the TAC.

Option 3

Proportional allowance

96 Applying this approach in option 3, it is proposed to reduce the recreational allowance from 360 to 261 tonnes, a reduction of 99 tonnes.

97 Decreasing the recreational allowance by 99 tonnes will increase the rate at which benefits can be gained by the stock moving towards B_{MSY}.

98 A reduction in the recreational allowance of 99 tonnes is substantial and will result in social and economic impacts to the recreational sector. As discussed in option 1 and 2, these impacts are difficult to measure and as a result remain uncertain.

Non-proportional allowance

99 MFish proposes no change to the current recreational allowance under this approach for option 3.

100 The benefit of this option to the recreational sector is that recreational fishers will retain their existing allowance, and will gain from any increased rebuild as a result of the reduction to the TAC.

Other Management Controls

Management of recreational landings

101 In order to ensure the sustainability and rebuild objective for the stock is not compromised the Minister is obliged to manage recreational catches within the set allowance. If the allowance is being exceeded, or is likely to be exceeded, the Minister can either increase the allowance, or implement management controls to restrain catch within the allowance

Proportional allowance approach

102 Under the proportional allowance approach, the recreational allowance in SNA 8 would be decreased by 25, 49, or 99 tonnes, depending on the TAC reduction option chosen. Current recreational catch has been assumed in the stock assessment at between 300 and 600 tonnes. Reducing the allowance below 300 tonnes creates risk that the allowance would be exceeded. It is also evident from the projections modelled in the 2005 stock assessment that if future catches increase as the stock rebuilds, the proposed allowance could be exceeded in the future.

103 No detailed analysis has been undertaken on ways to reduce recreational catch in the SNA 8 fishery. However there is only a limited range of effective tools available under the Act, most particularly minimum legal size limits and bag limits. In the absence of this analysis MFish propose a reduction to recreational bag limits as the likely most effective tool.

104 The change in bag limit necessary to ensure recreational catch does not exceed the allowance is hard to determine because there is uncertainty around the existing level of recreational catch, and the relationship between recreational catch and the bag limit.

105 However, as a pragmatic first step towards ensuring recreational catch does not exceed the proposed allowances under the proportional allowance approach, a potential management measure is to change the SNA 8 daily bag limit to more accurately reflect daily bags landed by recreational fishers. The current bag limit for SNA 8 is 15 in the northern areas of the stock (Fisheries Management Area 9), and 10 in the southern areas (Fisheries Management Area 8).

106 Anecdotal evidence suggests that fishers often catch their bag limit of 10 in southern parts of the stock. It is not known whether the current bag limit of 15 is commonly caught in the northern areas. The 2001 National Marine Recreational Fishing Survey showed that 10 fish or less were caught in 95% of all fishing trips. An option available to use as a part of the rebuild strategy is to reduce the bag limit to 10 in the northern parts of the stock, making the bag limit 10 for the whole of the SNA 8 fishery.

107 Decreasing the bag limit to 10 in the northern part of the stock is unlikely to constrain recreational catches to the reduced allowances in the future. A detailed analysis of the effect of bag limit reductions is required, supported by improved estimates of recreational catches. Improved recreational catch estimates will not be available until at least late 2006 following the next survey of recreational catch in SNA 8. At this time it will be necessary to review the recreational allowance and bag limits for the stock.

Non-proportional allowance approach

108 No changes to the recreational allowance have been proposed under this approach and MFish considers the current recreational allowance is sufficient given uncertainty in recreational catch information. However, the Snapper Working Group acknowledged that recreational catches may increase as the stock improves. The effect of this catch increase on the rebuild rate of the stock was modelled (Table 2). The projections show under all three options that if current recreational catch levels are maintained, the rebuild of the fishery will occur in the fastest timeframe.

109 However, a slowly increasing recreational catch has the potential to affect the fishery's rebuild. A much slower rebuild, as well as a reduced probability that the rebuild will occur, is likely. For example, with a TACC reduction of 125 tonnes, if recreational catches are currently 300 tonnes and are maintained at this level, the probability that biomass will exceed B_{MSY} in 2025 is 65%. If catches are allowed to increase beyond the current level the probability is reduced to 45%.

110 Further, a slowly increasing recreational catch will also result in the current recreational allowance being exceeded. Estimated future catches were modelled in the 2005 stock assessment and are provided in Table 4.

Table 4. **Estimated future recreational catch (2010 vs. 2025) under different TACC options, where recreational catches increase as the stock rebuilds.**

TACC	Current catch scenario	2010		2025	
		Estimated recreational catch (tonnes)	Percentage increase (%)	Estimated recreational catch (tonnes)	Percentage increase (%)
1375 tonnes	300t	400	33	509	170
	600t	726	21	824	137
1250 tonnes	300t	425	41	566	189
	600t	767	27	937	156
1000 tonnes	300t	471	57	622	207
	600t	856	42	1112	185

111 The Minister is not obliged to undertake a proportional reduction between recreational and commercial interests when the TAC is reduced for sustainability purposes. However, where commercial catch is reduced, reasonable steps should be taken to avoid the reduction being unsuccessful because of increased recreational fishing.

112 There is no evidence available to show that recreational catches will definitely increase into the future or at what rate. On balance, MFish considers that the recreational allowance of 360 tonnes is likely to be the best estimate of current recreational catch. New information on recreational catch in the SNA 8 fishery will be available for use following research on SNA 8 recreational catch estimates in 2005–06. Given timeframes for the stock to rebuild, the modelled impact of increased recreational catch and uncertainty in information on current recreational removals, MFish do not consider the risk is sufficient to warrant additional management controls on recreational catch between now and when new data on recreational catch is available. Should new information indicate that recreational catch exceeds the set allowance, MFish will prepare advice to the Minister on available options including an adjustment to allowance and/or management controls to constrain recreational catch. However, the Minister is free to weight available information on risk differently and implement management controls should he consider it reasonable to do so.

113 MFish proposes a review of the effects of the recreational fishery under current controls on rebuild rates, when better recreational catch estimates are available.

Deemed Value

114 The current deemed value for SNA 8 is not acting as an incentive for fishers to balance their catch against ACE (see Annex One). Given the importance of rebuilding the SNA 8 fishery, the economic incentives fishers may gain by not balancing catch against ACE need to be removed.

115 A low deemed value has the potential to undermine any rebuild strategy adopted. MFish considers an annual deemed value set at 200% of the port price is the most appropriate way of achieving this disincentive. This is consistent with the deemed values set for other high value stocks, or stocks where there is a sustainability concern. A revised annual deemed value of $8.68 per kg is proposed. Differential deemed values will continue to apply.

Future Management

Compliance risks

116 Information from Fishery Officers suggests that high grading and dumping of snapper is more common on the west coast of the North Island than in other areas. By decreasing the available ACE as well as increasing the annual deemed value, there is a risk that more fishers will be tempted to high grade or dump their catch. If the number of high grading and dumping incidents does increase, this will have implications on compliance resourcing.

Recreational Catches

117 More research, and agreement on the value of existing information, is required for SNA 8 recreational catch estimates. Effective management of the stock is being compromised by this lack of information.

Future stock assessment

118 A revised stock assessment will be required by 2010 to ensure that the chosen rebuild strategy is working. Should the rebuild strategy be shown to be ineffective, or should more information on recreational and customary catches become available during this time, it is essential that the management strategy be reviewed and revised.

Statutory Considerations

119 In developing the proposed management options, the following statutory considerations have been taken into account:

a) The management options proposed for SNA 8 seek to provide for the utilisation of the fishery while ensuring the sustainability of the stock (s 8). In particular, the options seek to maintain the potential of the fishery to meet the reasonably foreseeable needs of future generations. Three TAC options are proposed to allow a choice to be made about the rate of stock rebuild as well as the degree of social, economic and cultural impacts on all fishers in SNA 8.

b) The TAC under s 13 should be set at or move the stock towards the level that can produce the maximum sustainable yield. The biomass of the SNA 8 stock is currently well below that level and a reduction in the TAC is required. The three TAC options proposed would all allow the stock to rebuild over time. A decision needs to be made about the rate and probability of this rebuild, considering all expected social, economic and cultural impacts.

c) The proposed TAC options have also taken into account the following factors:

i) Section 13 (2)(b)(ii) requires that a stock rebuild occur within an appropriate period, taking into account any *environmental conditions* that may affect the stock. Environmental considerations are not relevant to stocks such as snapper, which are long-lived and have many year classes in the population. The actual rate of rebuild achieved in the future may be affected by the year class strength of new recruits but this should not change any management strategy chosen.

ii) Section 13 (2)(b)(ii) also requires that a stock rebuild occur within an appropriate period, taking into account the *biological characteristics* of the stock. 20 years is considered a feasible rebuild timeframe given the low natural mortality of snapper.

iii) There is a requirement to have regard to the *interdependence of stocks* in determining the rate of rebuild (s 13 (2)(b)(i)). In the SNA 8 commercial fishery interaction with other stocks occurs, especially trevally (TRE 7) and red gurnard (GUR 1 and 8). These two species comprise a high proportion of the bycatch in snapper target fisheries, and snapper is the main bycatch species in west coast gurnard and trevally fisheries. The TAC options proposed may constrain these fisheries.

120 All of the proposed TAC options involve a reduction in current commercial catches that will have social, cultural and economic consequences (s (13)(3)). While a number of possible economic effects have been noted, the precise extent of those effects has not been quantified. Consequences (in the short term), will generally be adverse for the commercial sector, but are expected to be beneficial in the longer term when the stock can be harvested at the maximum sustainable yield. Reduced commercial catches should have beneficial social and cultural consequences under all options for all non-commercial fishers.

121 Like many species, snapper biomass tends to fluctuate over time due to variable recruitment that is most likely caused by ongoing changes in the environment. This natural variability is likely to be low (s 11(1)(c)) and has been taken into account in the range of proposed TAC options.

122 Section 9 sets out various environmental principles that need to be taken into account. Firstly, associated or dependent species should be maintained above a level that ensures their long-term viability (s 9 (a)). Associated or dependent species are any non-harvested species – such as seabirds or marine mammals – that are affected by the taking of any harvested species. Trawling for snapper on the west coast of the North Island occurs in the area between 1 and 4 nautical miles from shore where endangered Maui's dolphin are sometimes seen. However, there is no information that establishes that Maui's dolphin have actually recently been caught by trawlers in the area.

123 Trawl fisheries can be beneficial and harmful to seabirds; beneficial by providing new food sources; harmful through accidental captures of birds. The proposed reductions in SNA 8 catch limits will reduce trawl effort in the region while the fishery rebuilds, lessening any risks for these associated species. Further information about associated or dependant species is provided in Annex One.

124 The maintenance of biological diversity of the aquatic environment must also be taken into account (s 9(b)). The main commercial fishing method used in the SNA 8 fishery is bottom trawling (single and pair). There is a lack of qualitative and quantitative information on the direct and indirect impacts that this method may have on the biological diversity of the aquatic environment, on the west coast.

125 The nature of the effect of bottom trawling is uncertain. Trawling can change species composition and diversity, reduce cover and habitat complexity and bring about shifts in community structure. Reductions in trawl effort due to catch limit reductions would lower any impacts on the environment caused by this method. Further information is provided in Annex One.

126 Further, decision makers need to take into account the protection of habitat of particular significance to fisheries management (s 9(c)). Area closures along the coast and harbour entrances protect habitats of particular significance for SNA 8.

127 A wide range of international obligations relate to fishing, including use and sustainability of fishstocks; and maintaining biodiversity (s 5(a) and (b)). MFish considers that the management options for SNA 8 consistent with these international obligations. The proposed management options for SNA 8 are consistent with the provisions of the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992.

128 Existing controls (s 11(1)(b)) that apply to the SNA 8 fishery for sustainability purposes include a TAC, TACC and allowances, minimum size limits, an amateur bag limit and a variety of area closures. A list of all controls is contained in Annex One. Amongst the range of measures that can be used to ensure the sustainability of the fishery, MFish considers that TAC reductions, possibly combined with reduced recreational bag limits, are the most effective way to rebuild the SNA 8 stock.

129 No relevant fisheries plan has been approved under s 11(2A)(b) of the Act.

130 This paper has considered whether there are any relevant conservations services or fisheries services (as outlined in s 11(2A)(a and c)). No suggestion is made to alter any decision about whether such services are required.

131 MFish is not aware of any provisions in any policy statement or plan under the Resource Management Act 1991, or any management strategy or plan under the Conservation Act 1987 (s 11(2)(a) and (b)) that could be relevant to varying sustainability measures for SNA 8.

132 The provisions of the Hauraki Gulf Marine Park Act 2000 do not apply because the SNA 8 region is outside the Park area (s 11(2)(c)).

133 The nature of the fishery and the interests of each fishing sector have been considered in proposing the TACC and allowances for recreational and customary interests, and all other mortality to the stock caused by fishing. There are currently no mataitai within SNA 8. Some areas have been closed for customary fishing purposes as outlined in Annex One. No restrictions have been placed on recreational fishing in any area within the QMA under s 311 of the Fisheries Act. These factors are relevant considerations under s 21(1)(a and b), 21(4)(i and ii) and 21(5) of the Fisheries Act.

134 Section 10 sets out information principles that are to be taken into account when setting TACs. The catch limit options proposed for SNA 8 have been developed in response to the status of the stock outlined in the 2005 Plenary. MFish considers that the information in this report represents the best that is available on the current status of the SNA 8 stock.

135 While the stock assessment is considered to be the best available information, and has been agreed to at the 2005 Snapper Plenary, caution needs to be made when interpreting the data as there are risks inherent in all modelling. This risk has been discussed in the assessment of management options.

Conclusion

136 The 2005 SNA 8 stock assessment has shown that despite previous efforts to rebuild the fishery, current biomass of the stock is only about half of the target level. The stock assessment shows that under the current TAC there is a low probability that the stock will rebuild in the long term. Under s 13 of the Fisheries Act 1996, the Minister is obliged to rebuild SNA 8 to the target level.

137 SNA 8 is an important fishery to both recreational and commercial fishers. Accordingly there is benefit in rebuilding the stock at a faster rate than is likely under the current TAC. The paper proposes three alternative TAC options that will result in greater certainty of rebuild at a faster rate.

138 The key issues in considering the different TAC reductions are the benefits associated with the various rates of rebuild, relative to the socio-economic impacts of any catch reduction.

139 Two approaches have been proposed to set allowances and the TACC within each TAC option. The first approach is a proportional approach where allowances are made according to current TAC proportions. The second approach is a non-proportional allowance that focuses on future management opportunities and relative value to each sector.

140 The proportional approach results in a proportional reduction to the recreational allowance and the TACC. Under the non-proportional option only the TACC is reduced. The recreational allowance remains unchanged.

141 A proportional approach to setting allowances would require a reduction in the recreational allowance. To achieve this reduction, a corresponding reduction in the daily bag limit would be required. Information is available to guide how much the bag limit would need to decrease to achieve any of the allowance reductions proposed. As a first step, MFish has proposed to decrease the daily bag limit in the northern part of the stock from 15 to 10.

142 A non-proportional approach will not require a reduction in recreational allowance. However, if recreational catches are not capped at current levels, the modelling predicts that recreational catches will increase as biomass increases. If this assumption is correct, then progressively increasing recreational catch will slow the rebuild of the fishery and extend the timeframe required to reach the target biomass. As a result, MFish recommends that the effect of increasing recreational catches be reviewed when better recreational catch estimates are available.

Preliminary Recommendations

143 MFish proposes that the SNA 8 TAC be reduced to allow a rebuild of the stock, according to one of the three options below:

EITHER

Option 1

a) The TAC for SNA 8 be reduced from 2 060 tonnes to 1 922 tonnes and either:

Allocate the TAC with:

i) An allowance for recreational fishers of 335 tonnes;

ii) An allowance for customary interests of 50 tonnes;

iii) An allowance for other sources of mortality of 139 tonnes;

iv) A TACC of 1 398 tonnes.

Or

Allocate the TAC with:

i) An allowance for recreational fishers of 360 tonnes;

ii) An allowance for customary interests of 50 tonnes;

iii) An allowance for other sources of mortality of 137 tonnes;

iv) A TACC of 1 375 tonnes.

OR

Option 2

b) The TAC for SNA 8 be reduced from 2 060 tonnes to 1 785 tonnes and either:

Allocate the TAC with:

i) An allowance for recreational fishers of 311 tonnes;

ii) An allowance for customary interests of 50 tonnes;

iii) An allowance for other sources of mortality of 129 tonnes;

iv) A TACC of 1 295 tonnes.

Or

Allocate the TAC with:

i) An allowance for recreational fishers of 360 tonnes;

ii) An allowance for customary interests of 50 tonnes;

iii) An allowance for other sources of mortality of 125 tonnes;

iv) A TACC of 1 250 tonnes.

OR

Option 3

c) The TAC for SNA 8 be reduced from 2 060 tonnes to 1 510 tonnes and either:

Allocate the TAC with:

i) An allowance for recreational fishers of 261 tonnes;

ii) An allowance for customary interests of 50 tonnes;

iii) An allowance for other sources of mortality of 109 tonnes;

iv) A TACC of 1 090 tonnes.

Or

Allocate the TAC with:

i) An allowance for recreational fishers of 360 tonnes;

ii) An allowance for customary interests of 50 tonnes;

iii) An allowance for other sources of mortality of 100 tonnes;

iv) A TACC of 1 000 tonnes.

AND EITHER

d) Depending on the allowance approach taken, recreational catches be managed by:

i) A reduction in the amateur bag limit in the northern part of the stock from 15 to 10, in line with bag limits for the southern part of the stock.

OR

ii) A review of the effect of increasing recreational catches on rebuild rates of the stock when better recreational catch estimates are available.

AND

e) The annual deemed value of SNA 8 is increased to $8.68, 200% of the 2004 port price, to provide an incentive for fishers to fish with ACE and minimise the current over catch of the TACC.

ANNEX ONE

Biological Characteristics

144 Snapper are demersal fish found down to depths of about 200 m, but are most abundant in depths of 15–60 m. They are widely distributed in the warmer waters of New Zealand, and occupy a range of habitats, including rocky reefs and areas of sand and mud bottom. Snapper are predators and consume a variety of invertebrates, particularly crustaceans.

145 Large schools of snapper congregate before spawning and move on to the spawning grounds, usually in November-December. Snapper are serial spawners, releasing many batches of eggs throughout these months, although the spawning season may extend to March. The larvae have a relatively short planktonic phase that results in spawning grounds corresponding fairly closely with the nursery grounds of young snapper. Young fish school in shallow water and sheltered areas and move out to deeper water in winter. The fish disperse more widely as they grow older. They first reach maturity from 20 to 28 cm fork length at three to four years of age.

146 Snapper growth rates vary geographically and from year to year. Stocks from the west coast of the North Island grow faster and reach a larger average size than elsewhere. Snapper have a strong seasonal growth pattern, with rapid growth from November to May, and then a slowing down or cessation of growth from June to September. They may live up to 60 years or more and have very low rates of natural mortality. An estimate of $M = 0.051yr^{-1}$ was made for SNA 8 in the 2005 stock assessment which is lower than all other snapper stocks. Estimates of biological parameters are provided in Table 5.

147 Environmental conditions may affect stock abundance, as water temperature appears to play an important part in the success of recruitment. Generally strong year classes in the population correspond to warm years, weak year classes correspond to cold years.

Table 5: Estimates of biological parameters for SNA 8

Estimate	Value	Source
Instantaneous rate of mortality (M)	0.051 or 0.054	2005 Stock Assessment
Weight = a(length)^b (weight in g, length in cmFL)	a = 0.04467 b = 2.793	Paul (1976)
von Bertalanffy growth parameters	K = 0.160 T_0 = 0.11 L_∞ = 66.7	Gilbert and Sullivan (1994)
Age at recruitment (years)	3	Gilbert and Sullivan (1994)

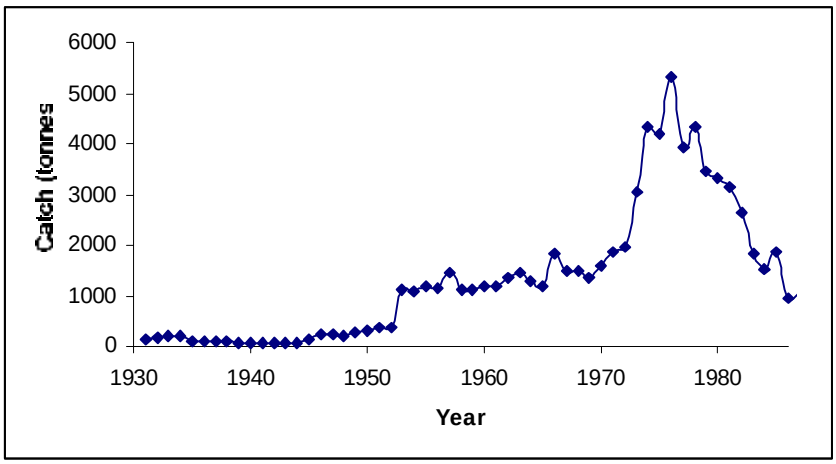
Catch Information

148 Most catches in the SNA 8 fishery are taken by the commercial sector. However, the fishery also supports important recreational and customary fisheries.

Commercial Fishery

149 The commercial fishery in SNA 8 developed in the 1930s with modest annual catches reported from 1930 to 1950 (Figure 2). The fishery expanded from the early 1950s and annual catches increased from between 100 and 300 tonnes, to fluctuate between 1 000 and 2 000 tonnes in the 1950s and 1960s. Catches again increased in the 1970s to reach a peak of 5 300 tonnes in 1976. Annual catches declined sharply after this peak, and continued to decline until the stock was introduced into the Quota Management System (QMS) in 1986.

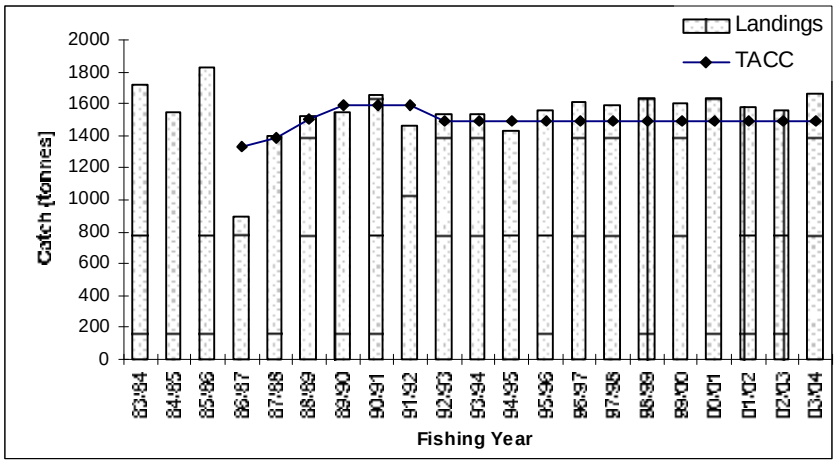
Figure 2. Total snapper landings in SNA 8 prior to introduction to the QMS



150 When SNA 8 was introduced into the QMS, it was considered to be over-exploited. Consequently, the initial TACC was set at a low level of 1 330 tonnes to enable the stock to rebuild. The TACC was progressively increased to 1 594 tonnes in 1989 as a result of decisions made by the Quota Appeal Authority. In 1992 it was reduced to 1 500 tonnes.

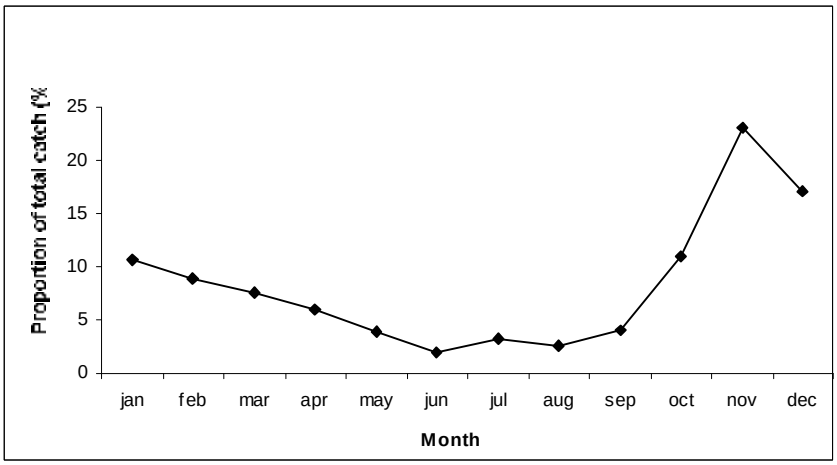
151 In 1986–87, SNA 8 landings were less than the TACC (Figure 3). However, catches subsequently increased and the TACC has been exceeded in all but four years since introduction to the QMS.

Figure 3. **Total snapper landings in SNA 8 since 1983–84, and TACCs since 1986–87**



152 Catches in SNA 8 are highly seasonal and are driven by snapper biology, as commercial fishers target spawning aggregations in spring/summer (Figure 4).

Figure 4. **Seasonality of snapper catch in SNA 8 (data from the 1989/90 to 2002/03 fishing years)**



153 In the 2003–04 fishing year, most vessels in the SNA 8 fleet were 10-20m boats, however the majority of catch was taken by 20-30m vessels. Small dories made up nearly 30% of the fleet yet they caught less than 1% of the total catch. Most of the vessels in the SNA 8 fleet are New Zealand registered (129 of 136).

154 Approximately half of the total landed SNA 8 is targeted. The other half of the fishery is landed as bycatch. 60% of SNA 8 landed as bycatch is caught as part of the target trevally fishery (TRE 7) and 20% from the target red gurnard fishery (GUR 1 and GUR 8). Snapper, trevally and red gurnard are closely associated fisheries (Table 6) and make up important components of the North Island west coast inshore trawl fishery.

Table 6. **Bycatch in the SNA 8, TRE 7, GUR 1 and GUR 8 fisheries**

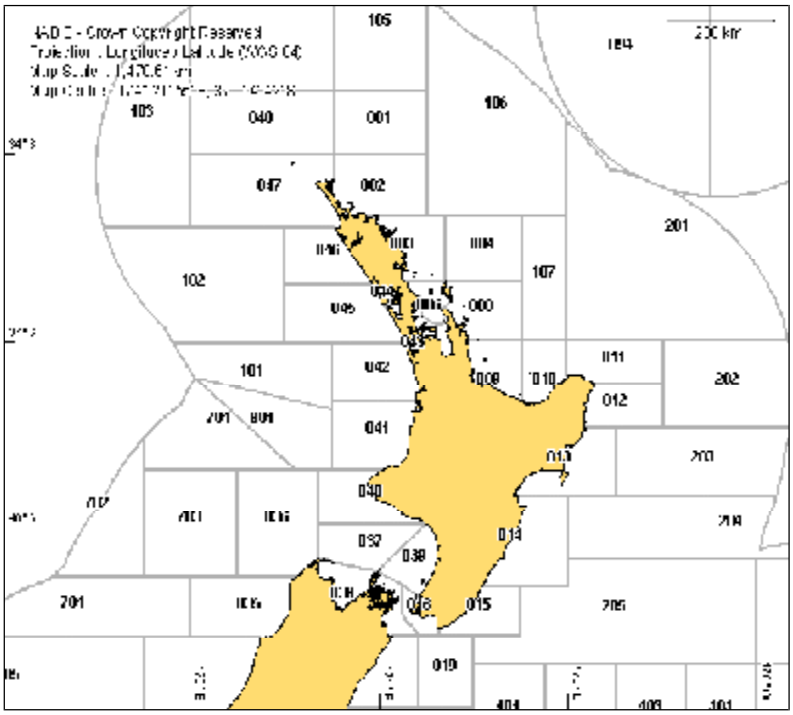
	Proportion of total bycatch in target fisheries (%)		
	SNA	TRE	GUR
SNA 8 target fishery		40.09	23.13
TRE 7 target fishery	31.02		17.00
GUR 1 target fishery	44.17	14.61	
GUR 8 target fishery	16.89	20.77	

Target fishery

155 Most of the target SNA 8 fishery is taken by single bottom trawl and smaller volumes are taken by paired bottom trawl. A small amount is also taken by long lining.

156 Historically, almost half of the SNA 8 target catch was taken in statistical area 045, with another 20% taken in area 47 and 20% taken in area 042 (Figure 5). In 2003–04 however, most SNA 8 target catch was taken in area 042, with much less catch taken in 047.

Figure 5. **Fishery statistical areas of the North Island of New Zealand. Statistical areas of the SNA 8 stock are 037, 039, and 040-048.**



Bycatch fishery

157 As with the target SNA 8 fishery, most of the SNA 8 caught as bycatch is taken by single bottom trawl and a smaller proportion by paired bottom trawl. A small amount of SNA 8 is taken as bycatch in set net fisheries.

158 Most SNA 8 caught as bycatch was taken in statistical areas 041 and 047. Since 2000–01 however, a significant proportion of the catch has also been taken in area 045 as well as 041 and 047.

Recreational Fishery

159 West coast snapper are highly prized by recreational fishers. In 1998, a Total Allowable Catch was set for SNA 8, with a recreational allowance of 360 tonnes. At the time, MFish considered 360 tonnes for recreational interests was appropriate as it allowed for non-commercial catch at the upper range of previous catch estimates.

160 There is a great deal of uncertainty about the total catch of snapper by recreational fishers in SNA 8. Estimates from the National Marine Recreational Fishing Surveys have ranged from 236 tonnes to 1 133 tonnes (Table 7). Unfortunately, no single survey can be considered an accurate estimate of recreational catch for SNA 8. The Recreational Technical Working Group concluded that 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 estimates are implausibly high for many important fisheries.

Table 7. Recreational catch estimates for SNA 8. The telephone/diary surveys ran from December to November but are denoted by the January calendar year. Mean fish weights were obtained from boat ramp surveys.

Year	Method	Number of fish (thousands)	Mean weight (g)	Total weight (t)
1991	Tag ratio	-	-	250
1994	Telephone/diary	361	658	238
1996	Telephone/diary	271	871	236
2000	Telephone/diary	648	1 020	661
2001	Telephone/diary	1 111	-	1 133

161 The Snapper Working Group has acknowledged that there is uncertainty concerning the interpretation of catch levels provided in the national surveys. For the 2004 assessment, the Working Group agreed to use two recreational catch scenarios that were deemed to represent the upper and lower bounds of average recreational catch. These two recreational catch scenarios were also used in the 2005 stock assessment.

162 Amateur bag limits and minimum legal-size limits apply to the SNA 8 stock. In the northern part of the SNA 8 stock there is a bag limit of 15 and in the southern part of the stock there is a bag limit of ten. A minimum size limit of 27 cm applies to the whole SNA 8 stock. Some local areas also have a self-imposed code of practice. For example, fishing clubs in the Taranaki area have agreed to retain snapper of 30 cm or above.

Customary Fishery

163 Snapper are an important customary resource. However, there is no quantitative information on customary catch levels available. The customary allowance for SNA 8 was set in 1998 at 50 tonnes. This estimate was considered appropriate for the SNA 8 stock and at the time, MFish anticipated that more information would be available in the future following implementation of the Kaimoana Regulations. This information is still not available.

Illegal Catch and Other Sources of Mortality

164 Quantitative information on the level of illegal catch or other sources of mortality is not available. High-grading of longline fish and discarding of under-sized fish by all methods occurs. There is mortality caused by the capture and return of undersize snapper, and mortality caused by snapper escaping through trawl meshes.

165 For SNA 8 modelling purposes an assumption was made that prior to 1986, non-reporting of catch was 20% of reported domestic commercial catch. Since introduction to the QMS, this non-reported catch has been assumed at 10% of reported domestic commercial catch. This is to account for all forms of "other sources of mortality".

166 The allowance for other sources of mortality was set in 1998 at 150 tonnes, 10% of the 1 500 tonnes TACC.

Stock Assessment Information

167 A revised stock assessment of SNA 8 was completed in 2005. The assessment model is age-based but includes approximations for length-based selectivities. Key model parameters included mean recruitment, a catchability coefficient, selectivity at length, natural mortality and year class strengths.

168 As previously mentioned, recreational catch estimates range from 236 to 1 133 tonnes. In the 2005 stock assessment, two recreational catch scenarios were used that were considered to represent the upper and lower bounds of plausible recreational catch. For the lower catch scenario an annual recreational catch of 300 tonnes was assume between 1990 and 2004. For the higher catch scenario the 1990 to 2004 value was 600 tonnes.

169 The Snapper Working Group discussed the use of appropriate reference points for reporting the stock status of SNA 8. Because the model uses variable growth curves through the calculation period, B_{MSY} will vary depending on the assumed growth rate and how growth might vary with stock size. Based on exploratory modelling of density-dependant growth, the Working Group adopted 20% B_0 as the definition for B_{MSY}, where B_0 is the base case model estimate of biomass in 1931.

Key indicators

170 The updated catch per unit effort showed a shallow decreasing trend from 1995–96 to 2000–01 followed by a general increase to 2003–04 (Figure 6). The Snapper Working Group considered these indices were more appropriate than the analysis used to generate the 2004 series, given that the 2005 analysis was based on data from core vessels only and that the model diagnostics were acceptable.

171 The biomass trajectory for the assessment models indicate slight declines in biomass have occurred recently (Figure 7). B_{04} ranged from 8 500 to 14 600 tonnes (Table 8). The estimates of current biomass relative to B_0 ranged from 7.8% to 12.5%.

Figure 6. **Single trawl catch per unit effort indices of catch per n. mile used in the 2004 and 2005 assessments.**

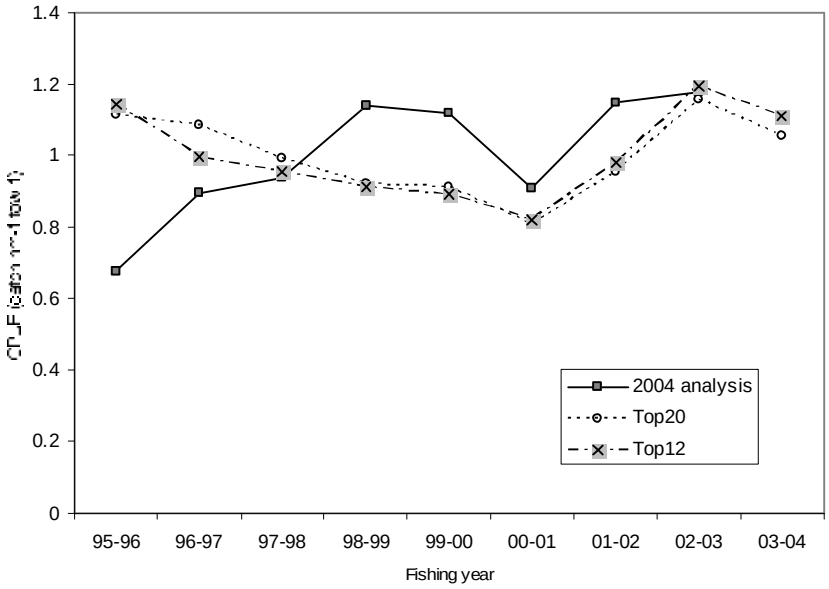


Figure 7. **Posterior distributions of the biomass trajectories for the SNA 8 model estimates assuming historical recreational catch of 300 t (left panel) and 600 t (right panel) with the tagging programme estimates of biomass (solid circles).**

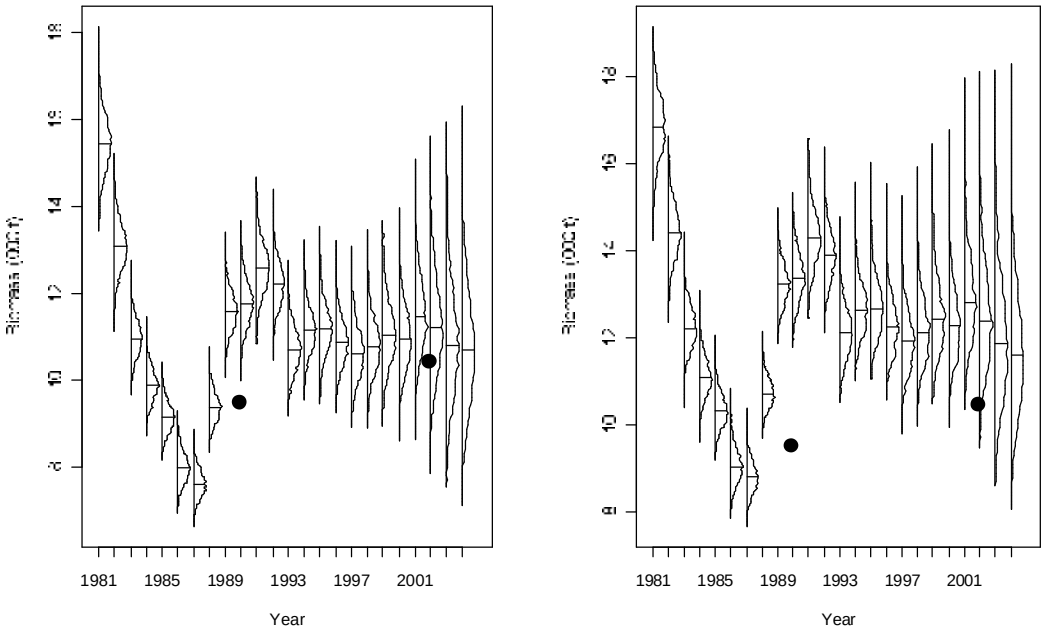


Table 8. **Mean of posterior distributions of biomass for the SNA 8 model using recreational catch levels of 300 t (R300) and 600 t (R600). B_0 is virgin stock biomass. B_{04} is the start of year biomass for 2003–04, and B_{04}/B_0 is the ratio of 2003–04 biomass to B_0. The 90% credible intervals were derived from the marginal posterior distributions for the Base case. The biomass units are 1000 t.**

Model run	B_0	5%	95%	B_{04}	5%	95%	B_{04}/B_0	5%	95%
R300	110	108	112	10.8	8.5	13.4	9.8%	7.8%	12.1%
R600	117	114	119	11.7	9.2	14.6	10.0%	8.0%	12.5%

Projections

172 Stochastic projections of the model to 2025 were undertaken to assess the probability of population increase and the decline in annual harvest proportions under alternative future catch levels.

173 Projections of population biomass have been modelled assuming future commercial catch over the range 500 to 1 500 tonnes. Two options were investigated for future recreational catch in projections; firstly, a constant recreational exploitation rate at the level estimated in the model in 2004 (Frec); and secondly, a constant catch capped at the level assumed for 1990-2004 (Rcap). Two alternative levels of 300 tonnes and 600 tonnes were assumed for the recreational catch from 1990 to 2004. A projection was also investigated that included zero future removals (commercial or non-commercial) from the population in all years. This was to determine the maximum rate of rebuilding possible for the population.

174 Under all future recreational catch options and at alternative levels of future TACC the stock is predicted to increase on average (Table 9, and Figure 8). The rate of increase was slightly lower for Frec options (constant recreational exploitation rate, Figure 8a and 8c) compared to the Rcap projection options (constant recreational catch, Figure 8b and 8d). The rate of rebuilding varied widely depending upon the assumed future TACC.

175 Under the Frec projection option, recreational take increases as the stock increases but is mediated by the domed recreational selectivity curve. The high proportion of young fish in the population after a period of low commercial fishing effort gives recreational fishers higher catches for the same effort. Under the slower rebuild, the young fish make up a relatively smaller fraction of the population leading to relatively smaller recreational catch.

Stock Status

176 The stock assessment indicates that current biomass is between 8% and 12% B_0. Stock biomass is predicted to slowly increase at the current TACC level. For the range of lower TACC levels tested, the rebuild to B_{MSY} (20%B_0) occurred after 2010 in all cases assuming either constant recreational effort, or capped recreational catch at the alternative levels of 300 tonnes or 600 tonnes per year. Rebuilding tended to be slower for runs that allowed the recreational catch to rise with increasing biomass.

Figure 8. **Mean of expected biomass relative to 20% of virgin biomass (B0) forecast to 2025 for the R300 and R600 models under two alternative options for recreational catch: Frec, constant annual exploitation rate at the MPD level estimated in 2004; and, Rcap, constant annual catch of 300 or 600 t respectively. For each model option a range of future TACC levels were investigated (500 to 1500 t), and compared to an option for zero removals from the population**

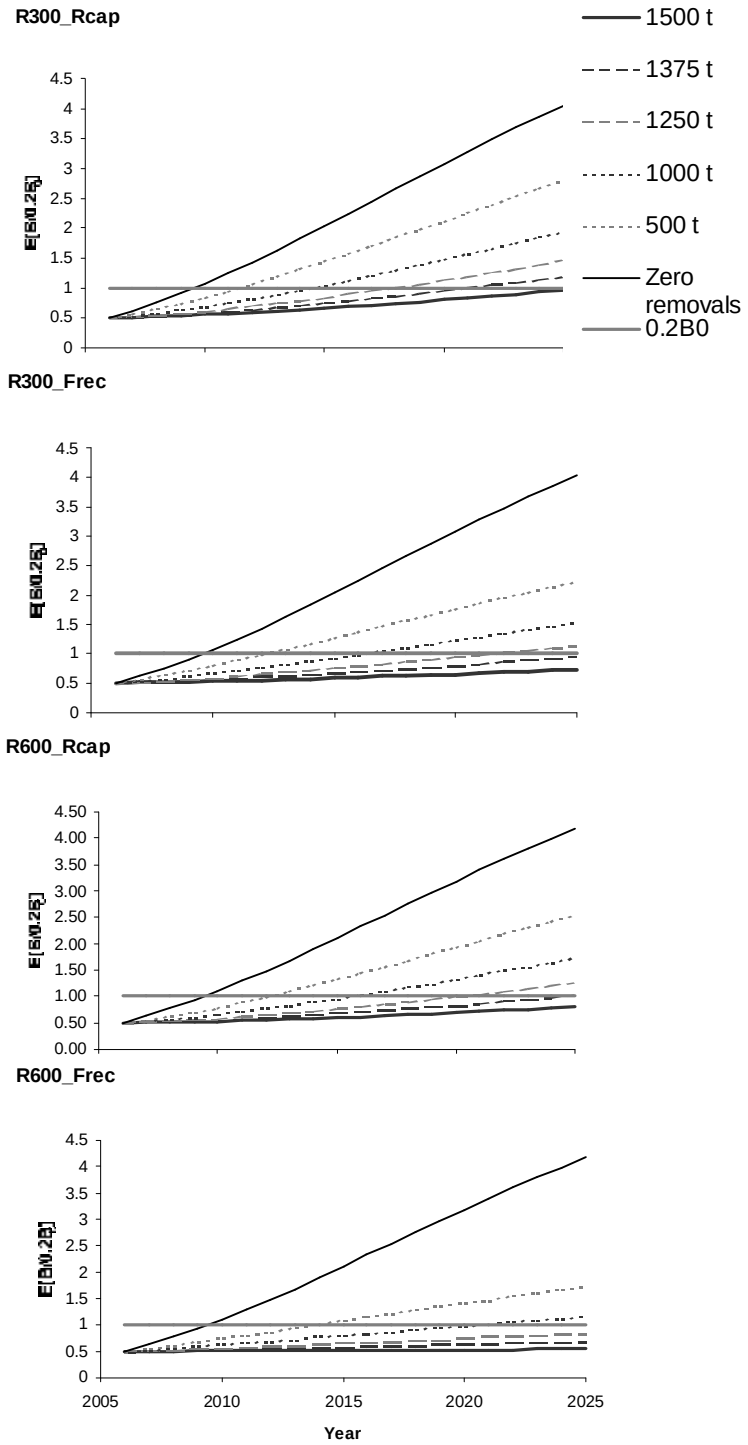


Table 9. Projection estimates for the R300 and R600 SNA 8 models under two alternative options for recreational catch: a) constant proportional recreational catch (*Frec*) equivalent to the proportional recreational harvest in 2005; and b) constant annual recreational catch (*Rcap*) Estimates are shown for a range of future TACCs and for a projection under zero removals, i.e. TACC = 0 t and zero recreational catch. B_{05} and B_{10} are start of year biomasses for 2004–05, and 2009–10, respectively. P(B_{10}>B_{05}) is the probability of B_{10} exceeding B_{05} and E() denotes expected value. The 90% credible interval for B_{10}>B_{05} were derived from the marginal posterior distributions. CR_{2010} is recreational catch in 2010. E(B_y) denotes the year B_{MSY} is expected to be reached.

(a) R300_Rcap

TACC (t)	E(B_{05}) (t)	E(B_{10}) (t)	B_{10}/B_{05}			P(B_{10}>B_{05})	E(CR_{2010}) (t)	Year when E(B_y)=B_{MSY}
			Expected	5%	95%			
500	10 891	18 538	1.70	1.29	2.13	1.00	300	2011
1 000	10 882	15 266	1.39	0.99	1.81	0.94	300	2014
1 250	10 869	13 709	1.25	0.83	1.67	0.84	299	2018
1 375	10 866	12 876	1.17	0.74	1.59	0.74	297	2021
1 500	10 904	12 206	1.10	0.71	1.51	0.64	296	>2025

(b) R300_Frec

TACC (t)	E(B_{05}) (t)	E(B_{10}) (t)	B_{10}/B_{05}			P(B_{10}>B_{05})	E(CR_{2010}) (t)	Year when E(B_y)=B_{MSY}
			Expected	5%	95%			
0	10 929	23 614	2.18	1.77	2.68	1.00	-	2010
500	10 929	17 747	1.63	1.30	2.01	0.96	561	2012
1 000	10 901	14 746	1.35	1.02	1.71	0.96	472	2016
1 250	10 913	13 288	1.21	0.84	1.57	0.83	426	2022
1 375	10 929	12 556	1.14	0.79	1.48	0.75	401	>2025
1 500	10 906	11 778	1.07	0.73	1.43	0.61	376	>2025

(c) R600_Rcap

TACC (t)	E(B_{05}) (t)	E(B_{10}) (t)	B_{10}/B_{05}			P(B_{10}>B_{05})	E(CR_{2010}) (t)	Year when E(B_y)=B_{MSY}
			Expected	5%	95%			
500	11 693	18 429	1.57	1.17	2.01	0.99	600	2012
1 000	11 713	15 353	1.30	0.87	1.74	0.88	599	2016
1 250	11 683	13 781	1.17	0.76	1.58	0.73	596	2020
1 375	11 676	13 087	1.10	0.70	1.53	0.64	591	>2025
1 500	11 695	12 337	1.04	0.67	1.46	0.53	583	>2025

(d) R600_Frec

TACC (t)	E(B_{05}) (t)	E(B_{10}) (t)	B_{10}/B_{05}			P(B_{10}>B_{05})	E(CR_{2010}) (t)	Year when E(B_y)=B_{MSY}
			Expected	5%	95%			
0	11 730	25 592	2.20	1.77	2.70	1.00	-	2010
500	11 676	17 346	1.49	1.19	1.84	1.00	1 013	2014
1 000	11 729	14 596	1.24	0.93	1.57	0.90	856	2021
1 250	11 710	13 106	1.11	0.80	1.43	0.71	767	>2025
1 375	11 702	12 419	1.05	0.75	1.39	0.59	726	>2025
1 500	11 700	11 799	1.00	0.70	1.32	0.48	690	>2025

Impacts of Fishing

Habitat

177 There is a lack of qualitative and quantitative information on the direct and indirect impacts that fishing methods used in inshore fisheries, including the SNA 8 fishery, have on habitat.

178 The primary method of catching snapper in the SNA 8 stock is bottom trawling (mostly single trawl). While evidence of the effect of bottom trawling is not conclusive, trawling can change species composition and diversity, reduce cover and habitat complexity and bring about shifts in community structure. There is no detailed information available on the range of benthic habitats on the west coast of the North Island where SNA 8 is caught. Such information is needed as the basis for assessing which habitats in the region are most at risk from trawling.

Impact on associated, dependant or protected species

179 All of the commonly caught bycatch species of the SNA 8 fishery are already managed in the QMS (Table 10). Capture of these associated species in the SNA 8 fishery is unlikely to have any significant negative affects on their sustainability.

Table 10. Species that make up 95% of the total bycatch in the SNA 8 fishery

Bycatch Species	% of bycatch
Trevally	40.09
Red gurnard	23.13
Barracouta	11.97
Kahawai	5.23
Tarakihi	4.00
John dory	3.91
School shark	3.15
Rig	1.56
Jack mackeral	1.23
Leatherjacket	0.83

180 Trawling on the west coast of the North Island occurs in an area that encompasses Maui's dolphin habitat. However, there is no information that establishes that Maui's dolphin have actually been caught by trawlers.

181 The current impact of the SNA 8 fishery on seabird populations is unclear. Trawl fisheries can be beneficial to seabirds by providing new food sources but incidental captures of seabirds may also affect seabird populations. White-capped albatross and sooty shearwater are the species most frequently killed by trawling. Species such as white-fronted terns, Hutton's and fluttering shearwaters, which typically feed in association with schooling fish, are at greatest risk.

182 In the *National Plan of Action to Reduce the Incidental Catch of Seabirds in New Zealand Fisheries*, the snapper longline fishery has been identified through existing observer coverage information as interacting with seabird species. However, long lining is not a common method of snapper fishing on the west coast, taking only 5% of all SNA 8 landed.

Existing Controls

Marine Reserves

183 There is one marine reserve in FMA 8 & FMA 9 – the Kapiti Marine Reserve. The reserve is 50 kilometres north of Wellington and is a meeting place of two major sea currents, which results in high biodiversity. There is also a proposed marine reserve in Paraninihi, north Taranaki and the proposed Tapuae Reserve surrounding the Sugar Loaf Islands Marine Park.

Commercial fishing regulations – Auckland and Kermadec Fishery Management Areas

184 The following commercial controls are relevant to the northern part of the SNA 8 stock:

a) Trawling and Danish seining are prohibited within 1 mile of the west Auckland coast between Scott Point and Tirua Point, and in defined areas within Kawhia Harbour, Aotea Harbour, Raglan Harbour, Manukau Harbour, Kaipara Harbour, Herekino Harbour, Whangape Harbour, Hokianga Harbour, Waikato River Mouth. There are also set net length restrictions in those areas.

b) Between the 0m and 100m contour lines, commercial fishers may not use a trawl net with a mesh size of less than 125 mm in the cod end, unless authorised to do so by a current fishing permit.

c) Drag netting is prohibited in Kawhia Harbour, Aotea Harbour, Raglan Harbour, Manukau Harbour, and Kaipara Harbour. Set netting is prohibited in defined areas. The netting restrictions were put in place to avoid problems associated with use of nets over rocky reefs, particularly to catch snapper and trevally.

d) The sale of nineteen species of reef fish is prohibited in this area. These reef fish species are sometimes caught by set netters targeting snapper and trevally over rocky reefs. There were concerns that because the reef fish species are sedentary they would take longer than other species to recover from any overfishing. The regulation was put in place to avoid targeting of these species.

e) No commercial fisher can take any fish from prescribed areas in Manukau Harbour during the hours between sunrise and sunset, nor cast overboard at any time any fish, fish offal, or other refuse likely to attract birds into the area. This regulation aims to limit the number of birds attracted to the flight path of Auckland International Airport.

f) Two large areas on the west coast have been closed to all amateur and commercial set netting to avoid incidental capture of Maui's dolphins:

   i) The area within 4 nm of the coast (outside the harbours) from Maunganui Bluff (north of Dargaville) to Pariokariwa Point.

   ii) The Manukau Harbour entrance area in a line from Puponga Point to a position 0.5 nm north of Kauri Point (at the eastern end of Big Bay).

g) Minimum set net mesh size for snapper and trevally in the Auckland and Kermadec FMAs is 125mm.

h) Minimum legal size of snapper is 25cm.

i) Fishing vessels must not transport a trawl net or otter board or other boards while using or transporting a seine net, and similarly must not use or transport a Danish seine net while transporting or using a trawl net.

Central Fisheries Management Area

185 The following commercial controls are relevant to the southern part of the SNA 8 stock:

a) Trawling is prohibited in Porirua Harbour, and Urenui Bay.

b) Danish seining is prohibited around the lower North Island, including on the west coast south of the marine automatic light on Tirua Point.

c) Commercial fishing for finfish is prohibited in Porirua harbour. Set netting is prohibited for recreational fishers within Pauatahanui Inlet, part of Porirua Harbour.

d) Minimum set net mesh size is 100mm.

Amateur fishing regulations

186 The following recreational controls are relevant to the SNA 8 stock:

a) The daily bag limit for snapper is fifteen in Auckland and Kermadec FMAs, and 10 in Central FMA.

b) The minimum legal size is 27cm.

c) Restrictions on fishing around the Sugar Loaf Islands include the prohibition of set nets or set lines for recreational fishers. Set nets may not be used at: Cape Reinga – Scott Point, Tauroa Point (Reef Point) – Whangape Harbour, Maunganui Bluff – Tirua Point, and Manukau Harbour entrance to Kauri Point.

d) Amateur fishing is prohibited in parts of the Manukau Harbour.

Social, Cultural and Economic Factors

Customary Importance

187 Snapper (tamure) are an important fishery for Maori and form part of Maori oral tradition. There are large deposits of snapper bones in the middens of prehistoric fishing camps. The annual catch of tamure is unknown.

188 Tamure is amongst the species listed in a Protocol between Te Uri o Hau and the Ministry of Fisheries, which covers a large portion of the Kaipara Harbour. The Protocol was established as part of a Deed of Settlement, and recognises Te Uri o Hau's interest in all species of fish, aquatic life or seaweed that exist within the Te Uri o Hau Fisheries Protocol area.

Spatial tools applied in the area

189 There is a taiapure at Kawhia-Aotea that includes the Kawhia and Aotea Harbours and 1nm around Gannet Island. There is also a taiapure application for Manukau Harbour, which includes the entire harbour inside Manukau Heads.

190 There is a temporary closure in Pukerua Bay (near Kapiti), which includes all forms of fishing except line fishing.

Recreational Interest

191 As noted, the SNA 8 stock is of significant recreational interest and catches have been estimated between 236 and 1 133 tonnes each year. The breakdown of recreational interest by area is not available.

192 In the 2000 and 2001 National Marine Recreational Fishing Surveys, recreational fishers line fishing from trailer-boats or dinghies took most of the recreational catch of SNA 8. Fishers on shore using rods and hand lines also took small volumes, as did people line fishing from charter boats. Snapper are an important target species for charter boats on the west coast of the North Island.

Economic information

193 There are currently 64 SNA 8 quota owners, only nine of whom own more than 10 tonnes of quota. During the 2003–04 fishing year, only 15 of the 66 quota holders actually fished. There are currently 99 holders of ACE, with amounts held ranging from 1 to 909 tonnes. There are 14 identities that hold more than 10 tonnes of ACE.

194 SNA 8 is mainly a target bottom trawl fishery based out of the west coast ports in the North Island. It also forms a bycatch of other target trawl fisheries (mainly TRE 7 and GUR 1 & 8). Fishers targeting snapper in these fisheries will be required to purchase ACE for SNA 8, pay deemed values or cease fishing if they cannot secure sufficient ACE for the catch-balancing requirement. These requirements mean that the SNA 8 fishery has the potential to be highly constraining on the TRE 7 and GUR 1 & 8 target fisheries and cause them to be under-utilised. Since 1986–87 TRE 7 has been over caught twice and significantly under caught twelve times. The TACCs for GUR 1 & 8 have never been fully utilised. GUR 1 has been 50% under caught on average in all years, and GUR 8 under caught by 30-50%.

Commercial value

195 Snapper traded price is approximately $42 550 per tonne ($90^{th}$ percentile for transactions from 1 October 2001).

196 As SNA 8 catch balancing is subject to differential deemed values, ACE price varies significantly. Since the 2001–02 fishing year, ACE has ranged from less than $1.00 per kg to over $8.00 per kg. At September 2004, the average price of ACE was $2.38 and the 90^{th} percentile was $4.00.

197 The current port price for SNA 8 is $4.34 per kg, which has not changed since 2003 and is a slight increase from the 2002 port price of $4.26 per kg.

Deemed Value

198 The TACC for SNA 8 has been over caught in 14 of the 18 years since its introduction to the QMS. Deemed values exist to manage such overcatch and are intended to be set at a level that encourages all reported catch to be balanced with ACE.

199 Under the deemed value framework in MFish's policy guidelines, SNA 8 falls under the "all others" category, which means it is subject to differential deemed values. If fishers do not hold sufficient ACE to cover the amount of SNA 8 caught they incur interim and annual

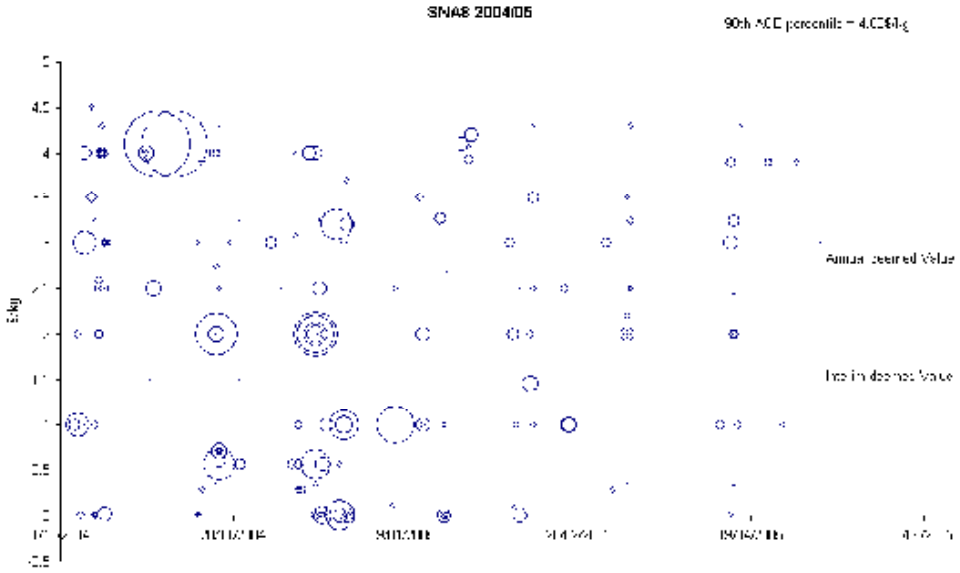
deemed value costs. The deemed value cost increases incrementally according to increases in catch.

200 The SNA8 deemed value is currently $2.59 per kg, or $2 590 per tonne, and ramps up to a maximum of $5.15 per kg when ACE is exceeded by over 200%. This deemed value was set in the 2000–01 fishing year on the basis of 90% of a port price of $2.88. The current port price is $4 340 per tonne and the current value of quota is $40 000 per tonne. ACE values have reached up to $4 500 per tonne in this current fishing year (Figure 10).

201 In 2001–02 and 2002–03 the total deemed value paid in SNA 8 was in excess of $250 000. In 2003–04 the deemed value paid was $570 286 with one entity paying a total of $168 425. These payments contrast with other snapper stocks. For example, the maximum deemed value paid in SNA 2 is $100 000; SNA 1 total deemed value payments average $30 000 per annum.

202 It is apparent that the current SNA 8 deemed value is not providing an incentive for individual fishers to balance catch with ACE. Under the current arrangements, it can often be cheaper to pay a deemed value, than purchase ACE. The deemed value must be raised to a level above ACE prices to ensure fishers balance their catch. An increased deemed value will also assist in mitigating the consistent TACC over catch, which is vital if a rebuild strategy is to succeed.

Figure 10. ACE trades for SNA 8 in the current 2004/05 fishing year. The annual and interim deemed values are shown.



Export returns

203 In 2003–04 approximately 63% of snapper was exported, with the main export countries being the United States (26%), Japan (18%) and Australia (14%). Snapper was exported to 37 countries in total. The total value of snapper exports in 2003–04 was almost thirty million dollars (Table 11).

Table 11. Export summary for snapper, including SNA 8, in 2003/04

Product Form		Kg weight	NZ$ FOB Value
		(% of export)	(% of export)
Snapper			
	Whole: live/frozen/chilled	4 094 556 (98.69)	28 140 083 (97.51)
	Fillets: frozen/chilled	35 284 (0.85)	588 224 (2.04)
	H&G: frozen/chilled	19 046 (0.46)	130 139 (0.45)
Snapper Export		4 148 886	28 858 446
Proportion of NZ Export		2.60%	5.08%

Research

204 The SNA 8 stock assessment is undertaken every three years, with the next assessment planned for 2007. Included in this assessment will be an updated catch per unit effort. An assessment of the age composition of trawl catches is completed each year.

205 A research project to estimate the recreational harvest of snapper in SNA8 will be undertaken in 2005–2006.