SECTION 13:

TOTAL ALLOWABLE CATCH

Summary

1 The Fisheries Act 1996 (FA 96) provides for sustainability measures to be set or varied in order to ensure sustainability. Section 11 of the Act sets out the matters that the Minister of Fisheries must consider before setting or varying a sustainability measure. Section 11(3)(a) of the FA 96 clarifies that sustainability measures may include the setting or varying of a catch limit for any stock.

2 The need to set or vary a sustainability measure is to be determined in the context of ensuring sustainability (as defined in the purpose (s 8) of the Act), taking into account the obligations specified in ss 9 (environmental principles) and 10 (information principles). Before doing anything under either s 11 or s 13, the Minister is required to consult in accordance with the provisions of s 12. All decisions must be made in a manner consistent with the obligations of s 5 (application of international obligations and Treaty of Waitangi (Fisheries Claims) Settlement Act 1992).

3 Catch limits for stocks managed under the Quota Management System (QMS) usually take the form of a total allowable catch (TAC) set or varied under s 13. This section of the Act prescribes the matters that the Minister must consider when determining a TAC. Other sections of the Act also contain provisions that allow the setting or varying of alternative and by-catch TACs for certain QMS stocks, provided such TACs are better able to meet the purpose of the Act than would a TAC set under s 13.

4 In setting or varying a TAC under s 13, the Minister is obligated to manage stocks at or above a level that can produce the maximum sustainable yield (MSY). The actual MSY for a stock will depend on the chosen harvesting strategy. In essence, s 13 prescribes a 'threshold' for ensuring sustainability. There is scope for a stock to be managed at levels higher than that necessary to produce MSY, but this is limited to considerations that are *intra vires* the FA 96. Importantly, this policy definition has been developed within the context of the policy for interpreting the scope of s 8 (purpose of the FA 96).

5 Through reference to s 13 stocks may be explicitly managed above the level that can produce MSY, if this is necessary in order to ensure the sustainability of interdependent stocks. Such a 'target level' may also be an appropriate management strategy in order to meet the wider social, cultural or economic goals provided for under s 8 (the purpose) of the FA 96, provided there is a high degree of consensus amongst stakeholders. Examples would include agreed management strategies to improve catch rates or produce large fish.

6 Where stock levels are above or below the 'target level', s 13 prescribes considerations for rebuilding or fishing down the stock. These considerations include explicitly balancing social, cultural and economic factors within biological constraints.

7 To assist with ensuring the sustainability of a stock or stocks, a TAC set or varied under s 13 of the Act may also need to be supported by additional sustainability measures. A range of non-limiting supporting options is outlined in s 11(3)(b)-(e) (sustainability measures).

8 Section 11(5) provides that when a catch limit is set or varied for a stock not subject to the QMS (a 'non-QMS stock'), then the Minister shall have regard to the statutory considerations associated with setting a TAC under s 13.

Purpose of this Policy Definition

9 The purpose of this FA 96 Policy Definition is to provide the Minister of Fisheries with a policy on the setting, or varying, of a TAC under s 13 of the Act. This section of the Act sets out requirements to rebuild, maintain or develop stocks, depending on the relationship of the current stock level to that which can produce the MSY.

Background and scope of legislative provisions

10 The QMS was introduced in 1986 to improve the management of New Zealand's fisheries. The primary goals behind establishing the QMS were to limit the catch of commercially harvested stocks to levels that would both conserve stocks, and enable greater economic returns. The QMS has the potential to achieve these goals and to maximise the net economic return from commercial fishing to the nation. Stocks are introduced to the QMS in accordance with the provisions of s 19, which includes the requirement for costs and benefits of such a step to be had regard to.

11 Under the FA 96, stocks are brought into the QMS via the provisions of ss 18 and 19. Key considerations required by these sections include the determination of the one or more species that form the stock, and the declaration of a Quota Management Area (QMA) for each stock.

12 Each stock introduced into the QMS has a TAC set by the Minister of Fisheries, in accordance with the provisions of s 13 (reproduced as Attachment A), or if an alternative (or by-catch) TAC is better able to meet the purpose of the Act, under s 14 (or s 14A). Once a stock is in the QMS, the TAC may be varied. Transitional arrangements are prescribed for setting TACs for stocks already in the QMS when the FA 96 came into effect. TACs must be set for these stocks as total allowable commercial catches (TACCs) are varied, although they may be set earlier.

13 Transitional provisions are also prescribed for stocks managed outside of the QMS. The FA 96 requires that in determining whether or not to set or vary a catch limit for a stock not managed under the QMS (a 'non-QMS stock'), the Minister must have regard to the matters referred to in s 13(2). These matters relate to stock maintenance, rebuild or fish-down strategies.

14 Section 13(1) requires the Minister to set a TAC by notice in the *Gazette*, for all stocks introduced into the QMS. Any TAC set will remain in effect unless varied, or until the QMA for that stock is sub-divided (when new TACs would be set for each new QMA).

15 The TAC specified under s 13 is required to maintain stock size, over time, at or above a level that can produce the MSY, having regard to the interdependence of stocks. MSY is defined as meaning (in relation to any stock) *'the greatest yield that can be achieved over time while maintaining the stock's productive capacity, having regard to the population dynamics of the stock and any environmental factors that influence the stock'*.

16 Section 13 in effect sets as a target, a stock level that can produce the MSY. This

obligation is drawn from Article 61 of UNCLOS[1]. The target can be modified (upwards only) if a higher level of biomass is required to ensure the sustainability of a stock, or of an interdependent stock. If the Minister considers that a TAC that is better able to meet the purpose of the Act than one set under s 13 is appropriate, then such a TAC can be set in accordance with s 14.

17 Section 13(2) sets out an obligation to move a stock towards or above a level that can produce the MSY, after having regard to biological and environmental factors. Section 13(3) requires the Minister to have regard to such social, cultural, and economic factors that he or she considers relevant, when determining the rate at which a stock is rebuilt or developed (as the case may be) to a level that can produce the MSY (as modified).

18 The application of the TAC setting provisions to the setting of a catch limit for a non-QMS stock (through s 11(5)), reflects an intent to have the explicit considerations of s 13(2) apply to catch limits for all stocks where appropriate. However, whereas the TAC 'shall' be set that manages the stock at or above a level that can produce the MSY, a catch limit for a non-QMS stock is set after the Minister 'has regard to' the same target stock level. This obligation requires the Minister to have good reasons if he or she decides not to act in accordance with s 13(2) when setting a catch limit for a non-QMS stock.

19 Section 13(4) enables the Minister to vary a TAC for a stock subject to the QMS by notice in the *Gazette*. Before varying a TAC, the Minister is required to have regard to the matters specified in subsections 13(2) and (3) when determining the target stock level, and the rate at which it is achieved.

20 Section 13(5) makes it explicit that a TAC can be set at zero under s 13(1), or varied to zero under s 13(4). This approach may be necessary in order to conserve depleted stocks, or for the setting of TACs (or catch limits for non-QMS stocks) in QMAs where the stock does not exist or for which there is no information.

21 Section 13(6) provides that any TAC set or varied by the Minister will normally have effect on or from the first day of the next fishing year for the stock concerned. However s 13(7) provides for within fishing year increases to TACs for highly variable stocks that are listed in the Second Schedule to the Act. Within fishing year increases to the TAC are limited in duration to the fishing year that they apply under s 13(8), and for the following year will revert to the TAC that formerly applied (unless varied under s 13(4)).

22 The combined provisions of s 13(7) and (8) may be used by the Minister to manage TACs in highly variable fisheries listed on the Second Schedule, and for which information on current biomass is available within a fishing year. In such cases an initial TAC can be increased. Section 13 does not provide for a within year decrease of a TAC (or by association a catch limit for a non-QMS stock) at any time.

23 Section 13(9) provides that the Governor-General may, by Order in Council, omit from, or add to, the Second Schedule the name of any stock.

24 Section 13(10) clarifies that the Minister does not have to set an initial TAC for a stock already in the QMS prior to the enactment of the FA 96, until he or she proposes to vary a

[1] United Nations Convention on the Law of the Sea. More detail on this convention and its application to the FA 96 can be found in the policy definition for s 5(a) (International Obligations).

TACC for that area or stock under s 20.

Discretion

25 Section 13(4) states that the Minister may vary any TAC once set, hence discretion exists as to whether or not to vary a TAC. The discretion over if and when TACs are varied under s 13(4) implies that there is no fixed period for the review of stock status.

26 Further, s 13(5) states that a TAC set under s 13(1) or varied under s 13(4), may be at, or to, zero. There is discretion as to if and when this approach has to be implemented.

27 In setting a TAC the Minister is required to achieve over time a stock level that is at or above a level that can produce the MSY for the stock, after having regard for the interdependence of stocks. For stocks either above or below this size there is discretion provided under s 13(3) regarding the way in, and rate at, which the stock can be moved towards a level that can produce the MSY. Target stock levels that are greater than prescribed by s 13 may be achievable through reference to the purpose (s 8) of the Act. This possibility is expressly provided for under s 14.

28 Stocks that are listed on the Second Schedule to the Act may have TACs varied upwards within a fishing year. Further, stocks may be added to, or omitted from, the Second Schedule. There is discretion as to whether stocks are listed are on the Second Schedule or whether the TAC for any such stock is varied during a fishing year.

29 Section 13(10) provides that for fishstocks already in the QMS prior to the passage of the FA 96, TACs do not have to be set until TACCs for those stocks are varied. There is discretion over whether TACs for such stocks are set earlier than required by the Act.

Limitations on Discretion

30 All setting or varying of TACs under s 13(1), (4) or (7) by way of a notice in the *Gazette* can only be done under the authority of the Minister. Any variations to a TAC under s 13(4) can only take effect at the beginning of a fishing year.

31 Where a stock is included on the Second Schedule, the TAC may be varied upwards during a fishing year, pursuant to s 13(7). Within fishing year increases can only be considered if supported by information related to the relative or absolute abundance of the stock during the current fishing year. Only the Governor-General has authority to add or omit stocks to, or from, the Second Schedule.

32 While discretion exists over the periodicity of the review of the status of stocks, this period should be appropriate to the natural variability of the stock, after having regard to the interdependence of stocks. If the best available information suggests that the sustainability of

a stock at the current or target biomass level is not ensured, then there is an implied obligation to review the stock status.

33 The ability to consider a proposal from stakeholders to have stocks managed at levels higher than prescribed by s 13 is limited to proposals that accommodate statutory bottom-lines. For any such proposal, a high degree of consensus would be expected before the Minister would agree to implement such an action. Without this consensus, the Minister would be

unfairly restricting access to resources that could otherwise be utilised within sustainable limits.

34 There is some discretion associated with the rate at which a stock is moved towards a level that can produce the MSY, however the TAC must be set at a level that ensures that a depleted biomass is at least trending towards that level. The purpose of the FA 96 (s 8) links rebuild strategies to future generations. This linkage requires the overall timeframe for a rebuild or fish down to be both appropriate to the biology of the stock, and within a period that maintains the potential for fisheries resources to provide for the reasonably foreseeable needs of future generations.

35 The discretion over setting TACs for stocks already in the QMS at the time the FA 96 was enacted, is limited to the extent that a TAC must be set if a TACC is varied.

Legislative Intent

36 The sustainable catch limits required by s 13 revolve around the target biomass level that can produce the MSY (as defined in Part I of the Act), and as modified where necessary to ensure the sustainability of interdependent stocks. This requirement is consistent with New Zealand's obligations under article 61 of UNCLOS.

37 The QMS is intended to be the primary management mechanism for commercial fisheries within the Exclusive Economic Zone (EEZ). For each stock in the QMS, a TAC is required to be set, and following a review may be varied. By association, the same requirements apply to stocks managed for harvest outside of the QMS. Different thresholds are set for species that are not managed for harvest, but which may be affected by fishing[2].

38 Government has also recognised that interim arrangements are required for non-QMS stocks, and that considerations for such measures should, as far as practicable, match those required for QMS stocks. In this regard a catch limit applying to all harvesters is to be the subject to the same considerations as a TAC.

39 Most TAC adjustments are to be made at the beginning of a fishing year. This provides harvesters with a level of security of access from year to year. It also provides for administrative efficiency in promulgating notices in the *Gazette*. If stocks undergo a serious decline during a year, then the provisions of s16 (emergency measures) may authorise management actions, such as the closure of an area to fishing. However, such actions do not extend to altering TACs within a fishing year.

40 Government has recognised that for some stocks, whose abundance is highly variable, there may be merit in considering increases in the TAC during the fishing year. Use of this provision under both ss 13 and 14 is conditional upon the availability of data on abundance that relates to the current year. Furthermore, to avoid TACs being set at high levels, but without the abundance data to support this in subsequent years, the intent was for any within year TAC increases to be limited to the fishing year to which the available information relates.

41 In setting or varying TACs for stocks that are considered to be below the level that can produce the MSY, Government has recognised that changes in catch limits have the potential

[2] Associated and dependant species that are not managed for harvest should be maintained above a level that ensures their long-term viability (except in the case of marine mammals and other wildlife where specific provisions may apply). For further information refer to policy definitions for s 9 (environmental principles) and s 15 (marine mammals or other wildlife).

for either positive or detrimental social, cultural and economic impacts. Therefore, the requirement of the Act is for these matters to be had regard to if the Minister considers them to be relevant, when determining the rate at which a stock is to be rebuilt to a level that can produce the MSY. The same considerations apply to the rate at which a stock is fished down (or developed) to a level that can produce the MSY (as modified in accordance with relevant biological and environmental considerations).

Relevant policy issues and proposed policy principles

42 The objectives of this policy definition are to develop policy on:

- when the Minister would consider setting, or varying, a TAC under s 13.
- the concept of MSY, and determination of the stock level that can produce MSY; how MSY is incorporated into the FA 96.
- interpreting the target stock level prescribed in s 13(2).
- rebuild or development strategies for stocks that are either below or above the target stock level, pursuant to s 13(3).
- when the Minister may consider setting or varying a TAC at, or to, zero pursuant to s 13(5).
- when stocks should be added to, or omitted from, the Second Schedule pursuant to s 13(9).
- when the Minister may consider increasing a TAC for a stock listed on the Second Schedule during a fishing year pursuant to s 13(7).

Setting or varying a TAC under section 13

43 The Minister is required to set a TAC for each stock as it is introduced into the QMS. A decision to introduce a stock into the QMS will be implemented by a notice in the *Gazette* under s 18. A TAC may be set under s 13(1) or, for some stocks, under s 14(1) (if listed on the Third Schedule to the Act) or s 14A (certain by-catch stocks). For stocks introduced into the QMS prior to 1996 a TAC should set under s 13(1) as TACCs for these stocks are reviewed (regardless of whether the TACC under review is ultimately varied).

44 A TAC set under s 13(1) remains in effect unless varied under s 13(4), reset under ss 14(1) or 14A, or until an alteration is made to a QMA under ss 25 and 26. Following an alteration to a QMA, TACs will need to be set for each new component of the former QMA.

45 To facilitate the review of TACs, MFish should operate a business process that allows fishery sustainability issues to be identified and evaluated. If a sustainability issue is identified, the Minister is required to take into account the matters specified in s 11(1) and 11(2A), and have regard to any relevant provisions of the plans specified in s 11(2) before taking action. Having met those obligations and associated obligations arising under ss 5, 8, 9, 10 and 12, the Minister is able to consider setting or varying sustainability measures under s 11(3), in order to manage any adverse effect of fishing.

46 If the Minister decides to vary a TAC set under s 13 in order to manage an effect of fishing, the TAC is varied under s 13(4). When considering the extent of any variation, the Minister is to have regard to the matters specified in subsections 13(2) (biological and environmental factors) and 13(3) (social, economic and cultural considerations).

47 The TAC set under s 13(1) will be the primary measure ensuring sustainability of stocks managed for harvest under that section of the Act, whereas other measures may perform that role for stocks managed under s 14 or s 14A. The Minister would choose the option of varying a TAC under s 13(4) (as opposed to any other of the options for ensuring sustainability available under s 11(3)) if, with reference to the best available information, it was demonstrably the most effective option for addressing the issue concerned, and any of the following applied;

48 Upward Variations of the TAC

- the stock was deemed to be above the target stock level, the biomass was not trending towards that level, and there was no consensus support from harvesters for the status quo (s 13(2)); or,

- the stock was trending towards the desired stock level, but not at an appropriate rate (s 13(3)); or,

- a decision rule, prescribing conditions under which TACs could be increased, in any relevant fisheries plan approved under s 11A of the FA 96 was invoked;

  and,

- the Minister, following consultation, was satisfied that a variation to a TAC was the preferred mechanism for moving a stock towards the target stock level (s 11(3)).

49 Downward Variations of the TAC

- the stock was deemed to be below the target stock level, and the stock was not trending towards that level (s 13(2)); or,

- the stock was trending towards the desired stock level, but at an inappropriate rate (s 13(3)); or,

- if, due to the interdependence of stocks, the Minister considered it necessary to reduce the TAC of one stock in order to prevent reducing the stock level of an interdependent stock; or,

- if, the population of an associated or dependent species was in danger of being reduced below a level that maintained its long term viability; or,

- if the fishing-related mortality of marine mammals or wildlife was likely to exceed limits set under relevant legislation; or

- the stock level was deemed to be at or above the level that can produce the MSY, but below the target stock level as determined by relevant, social, economic and cultural factors; or,

- a decrease in fisheries services increased the risk to the stock from being managed under the existing TAC (s 11 2A(a)); or,

- a decision rule in any relevant fisheries plan approved under Part III of the FA 96 was invoked (s 11 2A(b));

  and,

- the Minister, following consultation, was satisfied that a variation to a TAC was the preferred mechanism for moving a stock towards the target stock level (s 11(3)).

50 A decision to vary a TAC should be supported by relevant information. This means that for some stocks the setting of what are, in effect, multi-year TACs may be appropriate. TACs for some stocks may be reviewed over a time period that fits in with the available research information, after having regard to the biological characteristics of interdependent stocks. Where multi-year TAC strategies are set in place, decision rules should be developed to address situations where the stock may be coming under stress, (or at the other end of possibilities exhibiting high abundance), during the intervening years. Such rules may be best reflected in a Fisheries Plan approved under s 11A.

51 There may also be situations where harvesters seek to have a TAC varied where no threat to ensuring sustainability is identified. For example, a view may emerge that supports the maintenance of a stock biomass above the biological threshold required under s 13. The process for reviewing TACs should have a wide enough scope to consider the merit of such proposals on social, economic and cultural grounds. Addressing such a proposal would not require the Minister to follow the steps set out in s 11. Rather, the process of review could be initiated with direct reference to the provisions of s 13, rather than through s 11[3].

52 In addition to the need to have a process that reviews TACs, there is also a need to regularly update the management target, due to the variation inherent in the definition of MSY. This issue is discussed in paragraphs 61-63 of this document, and the full range of obligations for working with the MSY 'concept' are summarised in Appendix B.

The concept of MSY

53 Section 13(2) requires that the TAC be set to 'maintain the stock at or above a level that can produce the MSY, having regard to the interdependence of stocks'. The term "MSY", and the stock level that can produce it, is evaluated in this section.

54 MSY is defined in s 2 of the Act as, in relation to any stock, 'the greatest yield that can be achieved over time while maintaining the stocks productive capacity, having regard to the population dynamics of the stock and any environmental factors that influence the stock'. This definition is drawn from Article 61 of UNCLOS.

[3] For more information on the function of s 11 in the determination of sustainability measures refer to the s 11 policy definition.

Breakdown of the FA 96 Definition of MSY

The greatest yield that can be achieved over time while maintaining the stock productivity

55 This component of the definition relates to the biological definition of MSY[4]. The biomass that can produce MSY corresponds to the highest or maximum point on a theoretical yield curve across the whole range of stock sizes. However, fish populations are characterised by a high degree of year-to-year variability (even in the absence of fishing). This variability occurs in all four of the non-fishing factors that control population biomass: recruitment, growth, migration, and natural mortality. Factors causing this variability may be biological or non-biological. For example, the dynamics of the predator-prey relationship may cause substantial fluctuations in the abundance of both predator and prey, even in the absence of abiotic variability. Variations in the rate and location of ocean currents strongly influence primary productivity and thus the availability of food.

56 The time scale of this variability is important in the context of MSY. Much of the obvious environmental variability is at time scales of the order of a few years or less. There are strong daily and seasonal cycles, and much of the variability of major environmental oscillations (eg, the Southern Oscillation, which causes El Nino) occurs over time periods of several years or less. However there is clear evidence of significant environmental variation on time scales much greater than a few years (such as global warming due to depletion of the ozone layer).

57 In addition to stocks producing the MSY, there is a need to ensure that the stock has sufficient reproductive capacity to generate the recruits necessary to sustain the population. Additional management measures like minimum size limits and mesh sizes may be required to ensure that the population is being harvested appropriately. Such measures may be set under s 11(3) of the Act.

"Having Regard to"

58 This phrase requires the Minister to demonstrate that he/she has considered the specified matters. Having done that, the Minister is entitled to conclude they are not of sufficient significance, either alone or together with other matters, to outweigh other contrary considerations.

The Population Dynamics of the Stock

59 This consideration is inherent in the definition of MSY.

Any Environmental Factors that Influence the Stock

60 Environmental variability may affect stock abundance, and the implications of long term factors (such as climatic patterns, habitat modification and disease risks), must be considered when determining the level of biomass that can produce the MSY.

Estimating MSY

61 The factors inherent in the definition of MSY highlight the level of uncertainty in estimating MSY. Therefore there is a need to regularly review the MSY estimate for a stock, so that (where available) updated information on biological and non-biological variability can be

[4] The evaluation of MSY in this policy definition primarily draws on Francis, R. I. C. C. (1999): Moving towards B_{MSY}. *New Zealand Fisheries Assessment Research Document 99/2.*

factored in.

62 The reference points most commonly used to approximate MSY are Maximum Constant Yield (MCY) and Current Annual Yield (CAY), which derive from two ways of viewing MSY: a static interpretation and a dynamic interpretation (respectively). MCY is based on the idea of taking the same catch from the stock year after year over a long period of time. The dynamic interpretation from which CAY is derived, recognises that stock abundance fluctuates from year to year (from environmental and biological reasons, as well as fishery reasons), so to get the best yield from a stock it is necessary to alter the catch every year. This approach leads to the idea of Maximum Average Yield (MAY).

63 In addition to varying over time, a stock may have more than one MSY at any given time. What distinguishes one MSY from another is the harvest strategy that is used in the fishery. A harvest strategy is effectively a set of constraints within which yield is to be maximised. For example, if the strategy is to hold the TAC fixed, then the MSY is equal to the MCY; if it is to hold the fishing mortality fixed then the MSY is equal to the MAY. Other options are also available. The approach taken in setting TACs will need to reflect the nature of the available information. Where constant fishing mortality strategies are implemented, information on stock abundance should be regularly updated (preferably annually) so that abundance can be tracked and catch levels adjusted accordingly.

Stock Level that Produces MSY

64 The FA 96 requires that '*a stock level that can produce the MSY*' be achieved, rather than setting the MSY as the target yield. While expressed that way, the underlying intention of the Act is for fish stocks to be harvested at the MSY. The wording of the Act makes it clear that the value of MSY is not to be translated to a TAC where the stock level is below that which would achieve the MSY over time. Without this qualification, fish stocks could be overexploited in the pursuit of MSY.

65 The aim of management is to use the information from stock assessments to determine the current biomass with reference to the level that can produce the MSY, and then adjust catch limits (and/or management controls) to achieve the target biomass level over time. This aim has to be considered in the context of biological reality that MSY for a stock will vary over time, as will stock biomass.

Role of MSY in Management[5]

66 The stock level that can produce the MSY constitutes the environmental bottom line for fishery management. Under s 13, fishstocks can continue to be harvested when they fall below this threshold, but only in a way that ensures the stock is recovering toward the level that can produce the MSY. This threshold for stock management is necessary in order to meet the obligation in the purpose (s 8) of the Act to 'maintain the potential of fisheries resources to meet the reasonably foreseeable needs of future generations', as well as the obligations under UNCLOS.

67 In a multi-species fishery the relationship between stocks will be such that it is not possible to fish all stocks at MSY, without exceeding the environmental threshold for some of

[5] For an overview of the role of MSY as provided for under the FA 96, refer to Appendix B. As part of meeting the obligation to attain a stock level that can produce MSY it is necessary to be cognisant of the particular provision of the FA 96 that is the relevant consideration.

those stocks. The FA 96 provides management options to deal with this practical difficulty in conforming to the MSY threshold. One available option, is to set TACs for one or more stocks at less than otherwise prescribed by the MSY rule. This provision is considered in paragraphs 72-76 of this paper. Under a second option, s 14A provides that certain by-catch stocks may be able to be fished below the target stock level, provided specified conditions are met.

68 In some cases, management of a stock or stocks at the level that produces MSY will not necessarily be an optimal strategy for harvest. For instance, non-commercial fishers may prefer a higher biomass level so that the chances of catching the target species are enhanced for each fisher. Similarly, commercial fishers may prefer higher stock levels so that catch per unit effort, and hence profitability, are maintained at higher levels than possible if a stock is managed at the level that can produce MSY. The FA 96 does not preclude such outcomes, but does not directly prescribe a process for addressing issues generated by such a management strategy.

69 The Act contains some scope for the Minister for Fisheries to set the TAC at a level that allows the stock to be maintained above the level necessary to produce MSY. This is achievable through reference to relevant considerations provided for through the purpose (s 8) of the Act. These obligations include considerations that enable people to provide for their social, economic and cultural wellbeing. However in situations were these is no consensus amongst stakeholders for the TAC to exceed the MSY threshold, the Minister may not have a sufficient mandate to implement such a strategy.

70 A more transparent option for harvesters to have stocks managed at higher levels than required under the statute, may be through internalised (to the harvester group) management of harvesting rights allocated under s 21 (in the case of non-commercial) or s 20 (commercial). This approach would not require the Minister to establish whether there is a sufficient mandate from harvesters to implement such a policy.

Refining the target stock level for management under s 13(2)

71 Section 13(2) requires that the Minister set a target stock level that maintains the stock at or above a level that can produce the MSY, having regard to the interdependence of stocks. The purpose of s 13(2) is to set a target that will ensure sustainability of all stocks managed for harvest (other than pests or unwanted aquatic life) and the long term viability of associated or dependant species.

Interdependence of Stocks

72 The term '*interdependence of stocks*' is drawn from Article 61 of UNCLOS. Under UNCLOS, the intention was for the coastal state to take into consideration the effects of fishing on species associated with, or dependent upon, other species. The FA 96 sets a threshold for stock management, while it imposes other obligations for species that are not managed for the purpose of harvesting, but may be nevertheless affected by harvesting. Therefore a distinction is drawn between 'stocks' which are managed for harvest, and 'species' which are not.

73 In one sense, the FA 96 addresses the issue of stocks harvested simultaneously with others through the provisions of the QMS. Under the QMS, a TAC is set for each stock, and penalties are established for any overfishing of a TAC. This approach retains an incentive for fishers to modify their harvesting techniques to minimise the catch of stocks for which they may at one time hold insufficient quota. An explicit decision that could allow a stock to be reduced through fishing, to a level below that which can produce MSY, can only be made in accordance

with the provisions of s 14A of the Act. Section 14A specifies a range of criteria that must be met before the Minister can make such a decision.

74 A case could be made for modifying the target stock level for an exploited stock, where an associated species may be adversely affected by fishing. An example would be the impact of dredging and trawling on certain benthic fauna, such as a bryozoan community. However, such an effect would normally be managed through the setting of other forms of sustainability controls (such as area or method restrictions) under s 11(3) of the FA 96.

75 The obligation to have regard to the interdependence of stocks when setting a TAC for a stock also necessitates the consideration of the role of the stock in the biological food chain. The nature of predator-prey relationships may be such that a reduction in the abundance of a stock that is an important prey of one or more other (predator) stocks, to the level that can produce the MSY, may not always be appropriate. If, as a consequence of the reduction in the abundance of the prey stock, it is determined that a predator stock level may be reduced below that which can produce the MSY, then there is provision to set a TAC that maintains the prey stock at a higher stock level.

76 In summary, the FA 96 generally requires that all stocks managed under the QMS are subject to TACs that will allow the stock size to trend towards the level that can produce the MSY. Under s 13, the Minister is able to consider higher (but not lower) target stock levels.

Determination of TAC strategies

77 The preceding steps outlined above have involved[6]:

- determining the harvest strategy for a stock
- determining the stock level than can produce MSY (taking into account all factors inherent in the definition of MSY)
- if necessary, setting the target stock level higher than that required to produce MSY (after having regard to the interdependence of stocks)
- modifying the target stock level further upwards if there is a high level of stakeholder consensus for that approach.

[6] Refer to preceding discussion or to Appendix B for an overview. Note also that these steps are carried out in accordance with the overriding obligations arising under ss 5, 8, 9, 10 and 12 of the FA 96.

78 Section 13(2) of the Act requires that a TAC be set to achieve one of three broad objectives. Each relates to the target stock level (modified as per above if appropriate to do so). The three strategies concern:

- maintenance (subsection 2(a))
- rebuild (subsection 2(b))
- develop, or fish down (subsection 2(c)).

Stock Maintenance

79 Section 13(2)(a) applies to stocks where the best available information suggests the biomass is at or about the target stock level, in which case the stock should be maintained at that level.

80 The provision may need to be invoked once a stock rebuild or fish down strategy has been successfully implemented and completed.

Stock Rebuild

81 Section 13(2)(b) specifies matters that the Minister must have regard to when determining the rate at which the stock is moved upwards (rebuilt) towards the target stock level.

82 Section 13(2)(b)(i) requires the rebuild strategy to be one that is capable of achieving the target stock level.

83 Section 13(2)(b)(ii) sets out the biological and environmental considerations that determine the rate of rebuild. Under this subsection the Minister must determine a rebuild rate, after having regard to the biological characteristics of the stock and any environmental conditions affecting the stock over the period of the rebuild[7].

84 Relevant 'biological characteristics of the stock' would include longevity and productivity. In a general sense the longer lived the species is, the greater the rebuild timeframe could be. However if a long-lived stock has been depleted to a level where the reproductive capacity of the stock is threatened, then a faster rebuild rate would be appropriate, at least during the early years of the rebuild.

85 'Environmental factors' are incorporated into the definition of MSY. In the context of s 13(2)(b), environmental factors relate to the 'over time' component of the definition. The environmental conditions referred to in s 13(2)(b)(ii) affect the Minister's decision at a particular time, and the effects of changing environmental factors could well be relevant in considering the rate at which a stock size will change. An example is the known effect on recruitment for some stocks from changes in water temperature. A stock may need to be rebuilt over a longer time period if adverse environmental conditions prevail.

[7] Additional social, economic and cultural factors must also be considered when finally determining the rebuild rate under s 13(3). See paragraphs 89-91.

Stock Development

86 Section 13(2)(c) provides for a fish-down or stock development strategy. This subsection is invoked in situations where the best available information suggests that the current level of a stock is above the target stock level. It requires the Minister to determine a TAC that will allow the stock to move down towards the target level, which has been set after having regard to the interdependence of stocks.

87 Section 13(2)(c) requires a TAC to be set at a level that will allow the target stock level to be achieved. However there is no requirement for the Minister to ensure that quantity of fish is harvested if stakeholders choose not to completely exercise their rights, either individually or collectively.

88 There is limited scope for the Minister not to be bound by the provisions of s 13(2)(c). The Minister may determine a target stock level that is above the sustainability threshold prescribed under s 13. The purpose of the Act (s 8) provides for such a target level, if supported by relevant social, economic and cultural considerations or if deemed necessary to ensure sustainability. However, in the former case a high degree of stakeholder consensus would be required before the Minister would make a decision that in effect provides harvesters with less access to fisheries resources than could be justified on sustainability grounds alone. In the latter case a TAC would normally be set under s 14, rather than s 13.

Rate of stock rebuild or development under s 13(3)

89 The rate of rebuild or development required to achieve the target stock level, and therefore, the timeframe adopted to do so, is a matter of discretion for the Minister. Section 13(2)(b) requires that in the case where a rebuild is required, the biological characteristics and environmental factors affecting the stock need to be had regard to. Section 13(3) provides additional matters that the Minister shall have regard to when determining both the rate of a rebuild, or of development (fish down), to the target stock level. These additional matters are such social, cultural and economic factors that the Minister considers relevant.

90 The requirement to consider social, cultural and economic factors in determining the rate of rebuild or development is drawn from Article 61(3) of UNCLOS, and is consistent with the purpose of the FA 96. Initially the Fisheries Bill proposed that, for stocks below MSY, there should be an assessment of the net national cost and benefit to be gained from moving a stock to MSY. In essence the proposal applied where the cost of rebuilding a stock to MSY exceeded the benefits of doing so. In such cases there would have been no obligation on the Minister to rebuild the stock to MSY. However this option was not universally incorporated into the FA 96. An exception has been provided for stocks that are taken as unavoidable by-catch through the provisions of s 14A. Even then, setting a TAC under s 14A may, but not necessarily, lead to management of a stock below the target stock level. As it stands, s 13 is consistent with UNCLOS, and with the philosophy that the setting of a TAC should be primarily based on sustainability concerns.

91 The provisions of s 13(3) require the Minister to undertake a careful analysis of the social, cultural and economic costs and benefits, before determining the rate at which a stock is moved towards the target stock level. The time frame to achieve the target stock level will depend on the circumstances of a particular fishery, and the specific social, cultural and economic factors that apply to that fishery. Such considerations may lead to rebuilding or development strategies that require TACs to be varied over a number of years. However the

rebuild period determined under s 13(3), will be constrained by biological and environmental factors under s 13(2)(b)(ii), and therefore cannot be greater.

Setting or varying a TAC at, or to, zero under s 13(5)

92 Section 13(5) provides the Minister with the explicit authority to determine a TAC of zero, following consideration of the obligations of s 13(2)(b) and (3). It may be invoked in situations where there are strong biological reasons for prohibiting all removals from a stock in order to ensure sustainability. A TAC of zero may also be appropriate where the considerations of s 13(3) support a rapid rebuild.

93 While the FA 96 contains a range of offence and defence provisions that address an overrun of a TAC, setting a TAC of zero in a situation where the stock is inevitably taken as a by-catch may not be cost effective. If it was important to prohibit extractions entirely, method closures may also be required to reinforce a TAC of zero.

94 In some circumstances, a TAC may need to be set at zero when a stock is introduced into the QMS. This may apply within a QMA where the stock either does not exist, or for which there is no reliable information on stock abundance. In these situations the TAC could remain at zero until new information is available which demonstrates that sustainable yields can be taken from the stock within the QMA in question, or the Minister approves an exploratory fishing regime that is consistent with Part II of the Act.

Omitting or adding stocks to the Second Schedule

95 Stocks listed on the Second Schedule are able to have TACs varied during a fishing year, in accordance with s 13(7)[8]. Following the completion of that fishing year, TACs for those stocks must revert to the level set for the beginning of the fishing year in line with s 13(8), unless varied under s 13(4).

96 In order for a stock to be placed on the Second Schedule, it must be deemed to be one whose abundance is highly variable from year to year. At the time of the passage of the FA 96, two stocks; flatfish (comprised of eight species) and red cod were deemed to meet the variable abundance requirement. Abundance always retains a biological rather than economic interpretation.

97 In considering the addition of further stocks to the Second Schedule, the best available scientific advice is required, in order to determine whether the stock has sufficient year to year variation in abundance to be added to the Schedule.

98 A recommendation to omit stocks from the Second Schedule would be made where experience suggests that stock abundance is not sufficiently variable to require management decisions on catch limits to be made within a fishing year. The retention of a stock on the Second Schedule in itself does not require within fishing year TAC changes. Rather, listing on that Schedule is a prerequisite to the Minister approving within fishing year changes of a TAC. The proposal for such a change is most likely to be generated by those persons involved in harvesting the stock.

[8] Explicit provision for within year fishing increases is also provided for stocks listed on the Third Schedule to the FA 96.

Increasing the TAC of a stock on the Second Schedule during a fishing year

99 TACs for most stocks are set or varied at the beginning of each fishing year, under s 13(1) or s 13(4). In general, there should be a close relationship between the TAC and the achievable catch, although there may be circumstances where stakeholders choose not to harvest their entitlements for social, economic or cultural reasons.

100 Varying TACs for stocks whose abundance is highly variable from year to year requires information thresholds to be met. If a TAC is set for a stock in anticipation that that stock will have high abundance in that year, but this does not eventuate, then there may be associated implications for ensuring sustainability. These implications do not so much relate to the stock concerned (as stocks with highly variable abundance are likely to be resilient to the impact of harvesting), but to interdependent stocks, or associated or dependant species. Fishers may have problems keeping within their by-catch holdings or avoiding species that are not managed for harvest while endeavoring to catch the target stock (which in turn may not be as abundant as the TAC might infer). However when abundance is high, an inability to take surplus yields when they are available may represent lost potential from the fishery.

101 In a fishery where there is a substantial differential between the expected or actual catch, and the TAC, unused quota may be used to acquire minimum quota holdings as a cover for illegal activities. While the FA 96 contains provisions that deal with over-fishing of TACs, the setting of unobtainable TACs would place unnecessary demands on the compliance regime for by-catch stocks.

102 The need to implement within fishing year changes to TACs through notices in the *Gazette*, and to revisit allocative implications under s 68, may impose operational limitations for the administrative body. Harvesters may be able to establish more responsive controls. Such controls could apply to the exercising of harvesting rights, and may be implemented through leaseback of quota (in the case of a commercial fishery) arrangements. To be acceptable to the Minister, controls would need to restrict available quota of highly variable stocks to achievable levels in years of low abundance, and release quota in years of high abundance. Such an approach could be developed under a Fisheries Plan approved under s 11A.

103 In the absence of harvesters having an effective leaseback arrangement in place, the provisions of s 13 are interpreted as requiring TACs for highly variable stocks listed on the Second Schedule to, as a matter of practice, be set at levels that assume average to low abundance of such stocks. Where information is available on stock abundance within a fishing year, s 13(7) provides that the TAC may be increased for any stock listed on the Second Schedule, which would allow stakeholders to take advantage of the increased abundance for the remainder of the fishing year.

104 The Minister could consider increasing a TAC within a fishing year for a stock listed on the Second Schedule, following an application from a representative harvester group. The application should have substantial support from the relevant harvester group(s), and should report the views of other affected stakeholders

Links to other parts of the Fisheries Act

105 All policies for s 13, must be consistent with the overriding purpose and principles of the FA 96, clarified in policies for s 5 (Application of international obligations and Treaty of Waitangi (Fisheries Claims) Settlement Act 1992), s 8 (Purpose), s 9 (Environmental principles) and s 10

(Information principles).

106 Section 13 prescribes steps for the setting and varying of TACs. A TAC is normally set following a decision to include the stock in the QMS. The decision to vary a TAC will normally follow the measure being identified as the preferred option for ensuring the sustainability of a stock under s 11(3). A TAC may also be set or varied at a level that exceeds the sustainability threshold set out in s 13, through reference to relevant considerations that fall within the scope of the purpose of the Act. This pathway for TAC setting reinforces the linkages with the policy definition for s 8.

107 New stocks are brought into the QMS via the provisions of ss 18 and 19. Key considerations required under these sections include the determination of one or more species that form the stock, and the declaration of a QMA for each stock. The requirement to make these decisions before determining catch limits creates strong linkages between these sections and policy definitions for ss 13, 14 and 14A (which all provide for the setting of TACs). Linkages with ss 14 and 14A are reinforced through the need for certain criteria to be met on an ongoing basis, before TACs can be set under those sections. Otherwise the Act requires TACs to be set or varied under s 13.

108 Before doing anything under s 11 or s 14, the Minister is required to consult in accordance with the obligations set out in s 12. Consultation will assist the Minister in determining the best course of action to take to any given situation. This means there are important linkages between the policy definition for s 12, s 11 and s 14.

109 Prior to deciding to vary any sustainability measure in the form of a TAC or TCL, the Minister for Fisheries must ensure that the matters outlined in s 11(1) and s 11(2A) are firstly taken into account, and the matters outlined in s 11(2) are had regard to. Having done that, the Minister would need to be satisfied that varying a TAC was the best option to address a sustainability issue. These obligations create linkages with the policy definition for s 11.

110 Each harvest strategy for a given stock will have a particular MSY associated with it. Because of the requirement to manage stocks at a level referenced to the level that can produce MSY, the harvest strategy (normally determined under s 11) is a key consideration under s 13. Such a strategy could also be described and provided for through a fisheries plan approved under s 11A.

111 The Act requires the setting of a TAC under ss 13, 14 or 14A for all stocks that are introduced into the QMS. Transitional arrangements are required for setting TACs for stocks already in the QMS prior to 1996. Once a TAC is set for a stock, the Act provides that it may be varied. Section 13 provides for the setting and varying of TACs, and sets out the specific provisions for determining TAC levels. Through s 11, similar considerations apply to the setting and varying of TCLs, reinforcing the linkage with the policy definition for s 11.

112 TAC decisions made under s 13, lead on to decisions made under s 20 (TACC setting) and s 68 (within fishing year allocation of a higher TAC) of the Act. Having set a TAC, the Minister is required to allow for all other forms of mortality under s 21, before setting a TACC for each stock in the QMS under s 20. A linkage is therefore established between policy definitions for s 13 and for ss 20 and 21. No policy definition has been prepared for s 68.

Application of Section 13

113 MFish needs to develop a business process that provides for the setting or varying of TACs. The need to set a TAC under s 13 may arise through different circumstances:

- On the entry of a stock into the QMS (following a decision under s 18).
- For stocks introduced into the QMS prior to 1996, TACs are to be set as TACCs are varied (in accordance with s 13(10)).
- Following the alteration of a QMA (pursuant to s 25).

114 Once set, the TAC may be varied under s 13(4). This would occur where;

- the Minister decides to vary a sustainability measure (in response to a threat or opportunity) under s 11(3)(a)).
- TACs formerly set under ss 14 or 14A are no longer appropriate, and need to be varied to conform to the sustainability 'threshold' requirements of s 13.
- the Minister agrees to implement a harvester proposal that exceeds the sustainability 'threshold' prescribed under s 13 (reference to wider purpose of the Act (s 8)).

115 The business process for setting and varying TACs must ensure that best information relevant to the type of TAC decision being made is available to the Minister. However, in all decisions, the Minister must be provided with advice on the appropriate target stock level required under s 13.

116 In general, advising on the target stock level will involve a standard set of steps;

- determining the harvest strategy for a stock
- determining the stock level than can produce MSY (taking into account all factors inherent in the definition of MSY) for a particular harvest strategy
- considering whether it is necessary to set the target stock level higher than that required to produce MSY (after having regard to the interdependence of stocks)
- considering whether to modify the target stock level upwards (ie exceeding the 'sustainability threshold') if there is stakeholder consensus for that approach. Such a proposal could reasonably be expected to link back to a fisheries plan approved under s 11A.

117 For stocks that are below the target stock level, biological and environmental factors must be had regard to before determining the rate at which the target stock is achieved.

118 For stocks that are above or below the target stock level, the Minister shall have regard to relevant social, cultural and economic factors before determining the rate at which the target achieved. These considerations may necessitate in-depth analysis of the available options,

however it is reasonable to expect much of the relevant information to be provided by persons with an interest in the fishery. The business process would need to balance the pros and cons associated with different rebuild rates that lie within the parameters determined by biological and environmental considerations.

119 The provisions of s 11(5) require that similar considerations are required when determining a TCL for a non-QMS stock.

120 Explicit provision is made for the Minister to be able to set or vary TACs at, or to, zero. This should only apply where there is no information to support the initial setting of TACs, where such an action is deemed necessary to ensure the conservation of the stock, or where relevant biological, environmental, social, economic and cultural considerations support a rapid rebuild of a depleted stock.

121 Stocks may be included on the Second Schedule through the authority of the Governor-General, on the recommendation of the Minister. Once a stock has been included on that Schedule, the Minister would consider setting 'base' TACs are at, or varied to, a level that is around average historical yields. A process for reviewing TACs for these stocks within the fishing year must then be provided for, and any evaluation must include information related to the current fishing year. Such TACs can be increased under s 13(7), but must revert to the initial TAC for the start of the following fishing year (unless varied under s 13(4)).

122 There is a non-statutory alternative to within fishing year increases to stocks listed on the Second Schedule. It may be more cost-effective for harvesters to implement lease-back arrangements that have the same effect as the statutory provisions.

123 Before confirming any decision made under s 13, the Minister would need to ensure that any decision was; was consistent with s 5 (international and Treaty Obligations), within the scope of s 8 (purpose) and took into account s 9 (environmental principles) and s 10 (information principles).

Appendix: A

13. Total allowable catch–(1) Subject to this section, the Minister shall, by notice in the Gazette, set in respect of the quota management area relating to each quota management stock a total allowable catch for that stock, and that total allowable catch shall continue to apply in each fishing year for that stock unless varied under this section or until an alteration of the quota management area for that stock takes effect in accordance with sections 25 and 26.

(2) The Minister shall set a total allowable catch that–

(a) Maintains the stock at or above a level that can produce the maximum sustainable yield, having regard to the interdependence of stocks; or

(b) Enables the level of any stock whose current level is below that which can produce maximum sustainable yield to be altered–

(i) In a way and at a rate that will result in the stock being restored to or above a level that can produce the maximum sustainable yield, having regard to the interdependence of stocks; and

(ii) Within a period appropriate to the stock, having regard to the biological characteristics of the stock and any environmental conditions affecting the stock; or

(c) Enables the level of any stock whose current level is above that which can produce the maximum sustainable yield to be altered in a way and at a rate that will result in the stock moving towards or above a level that can produce the maximum sustainable yield, having regard to he interdependence of stocks.

(3) In considering the way in which and rate at which a stock is moved towards or above a level that can produce maximum sustainable yield under paragraph (b) or paragraph (c) of subsection (2) of this section, the Minister shall have regard to such social, cultural, and economic factors as he or she considers relevant.

(4) The Minister may from time to time, by notice in the Gazette, vary any total allowable catch set for any quota management stock under this section by increasing or reducing the total allowable catch. When considering any variation, the Minister is to have regard to the matters specified in subsections (2) and (3).

(5) Without limiting subsection (1) or subsection (4) of this section, the Minister may set or vary any total allowable catch at, or to, zero.

(6) Except as provided in subsection (7) of this section, every setting or variation of a total allowable catch shall have effect on and from the first day of the next fishing year for the stock concerned.

(7) After considering information about the abundance during the current fishing year of any stock listed in the Second Schedule to this Act, and after having regard to the matters specified in subsections (2) and (3), the Minister may, by notice in the Gazette, increase the total allowable catch for the stock with effect from such date in the fishing year in which the notice is published as may be stated in the notice.

(8) If a total allowable catch for any stock has been increased during any fishing year under subsection (7) of this section, the total allowable catch for that stock shall, at the close of that fishing year, revert to the total allowable catch that applied to that stock at the beginning of that fishing year; but this subsection does not prevent a variation under subsection (4) of this section of the total allowable catch that applied at the beginning of that fishing year.

(9) The Governor-General may from time to time, by Order in Council, omit the name of any stock from the Second Schedule to this Act or add to that Schedule the name of any stock whose abundance is highly variable from year to year.

(10) Subsection (1) does not require the Minister to set an initial total allowable catch for any quota management area or stock unless the Minister also proposes to set or vary a total allowable commercial catch for that area and stock under section 20.

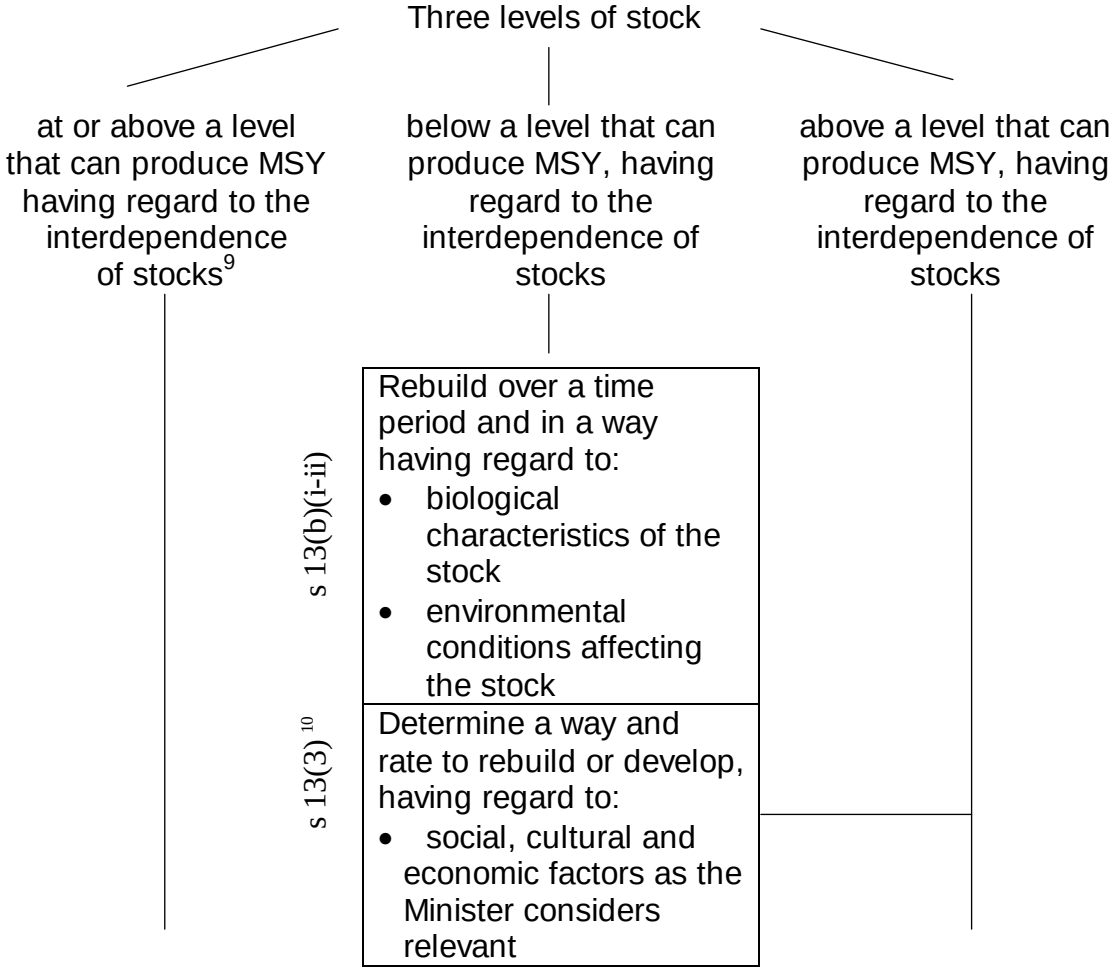
Appendix: B Tracking MSY through section 13

Step 1: MSY is defined as:

'the greatest yield that can be achieved over time while maintaining the stocks productive capacity, having regard to the population dynamics of the stock and any environmental factors that influence the stock'.

Note: Francis (1999) points out that MSY for a stock will depend on the chosen harvest strategy.

Step 2: Section 13(2)



Step 3: Section 13(2)(a-c)

Stock Maintenance | Rebuild Stock | Develop Stock

[9] Under this policy definition, interdependence of stocks relates primarily to trophic relationships between harvested stocks, and associated stocks managed for harvest. Section 9(a) imposes additional considerations in relation to species that are not managed for harvest, but which may be affected by harvesting, as does s 15 for marine mammals or other wildlife.

[10] Only in the middle of Step 2 does Section 13 provide for social, cultural and economic factors to be considered as part of the TAC setting process (in relation to stock rebuild or development). However, by direct reference to s 8 (Purpose) a high level of consensus on these matters may also lead to the setting of stock levels above those prescribed under s 13.