

Review of Sustainability Measures and Other Management  
Controls for Kahawai for the 2005-06 (1 October) Fishing Year

## **Initial Position Paper**

**8 July 2005**



# INTRODUCTION

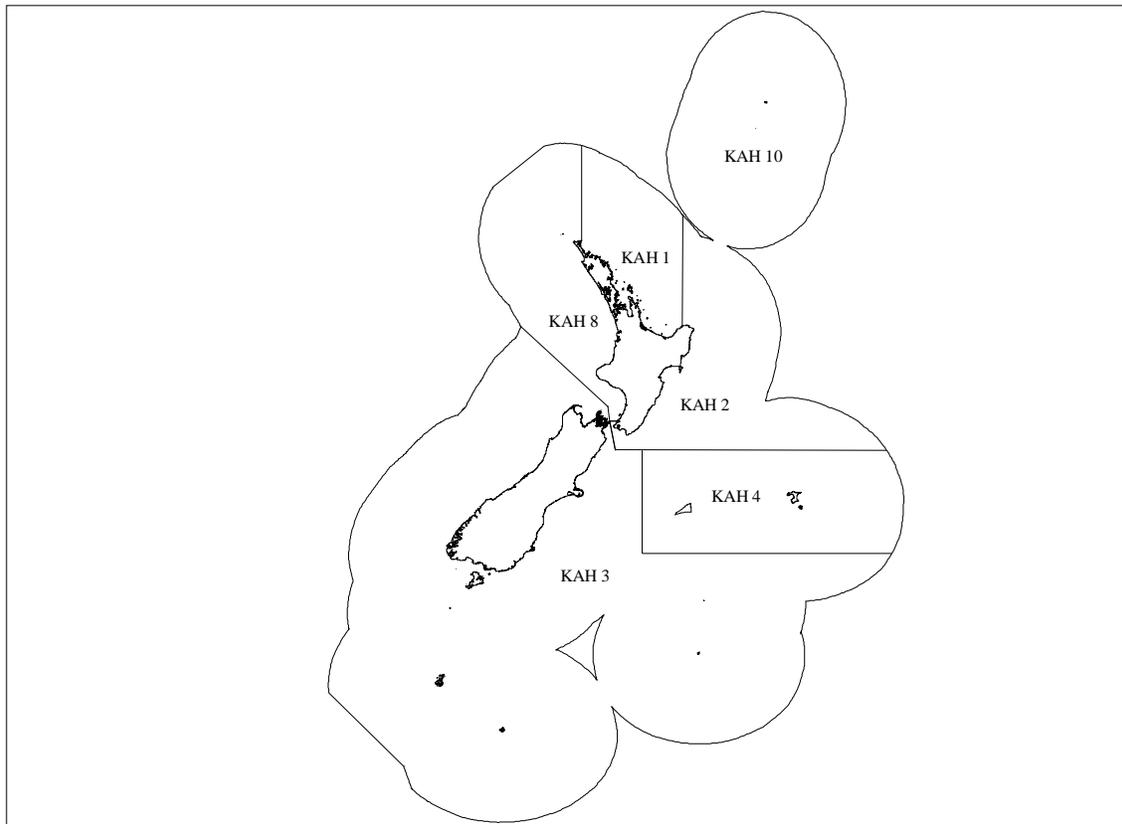
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- 1 The purpose of this Initial Position Paper (IPP) is to seek your views on Ministry of Fisheries (MFish) proposals for a review of catch limits and allowances for kahawai.
- 2 The IPP has been developed for the purpose of consultation as required under the Fisheries Act 1996. MFish emphasises that the views and recommendations outlined in this paper are preliminary and provided as a basis for consultation with stakeholders.
- 3 The process that is undertaken to develop the initial position in IPPs involves consideration of recent research, analysis of commercial catch data, and any other relevant information. All IPPs have regard to the legal obligations required under the Fisheries Act.
- 4 A standard section outlining MFish's statutory obligations and policy guidelines for a proposal contained within any IPP is available from MFish should you wish to refer to these matters. A copy is also contained in the document 'Review of Sustainability Measures and Other Management Controls for the 2005-06 (1 October) Fishing Year – Initial Position Paper – 30 July 2005'
- 5 MFish requests that you provide comments on the proposals for kahawai no later than **5 August 2005**. Please send your comments to: Kristin Philbert, Ministry of Fisheries, PO Box 1020, Wellington, or email [kristin.philbert@fish.govt.nz](mailto:kristin.philbert@fish.govt.nz)
- 6 Please note that all submissions are subject to the Official Information Act and can be released, if requested, under that Act. If you have specific reasons for wanting to have your submission withheld, please set out your reasons in the submission. MFish will consider those reasons when making any assessment for release of submissions if requested under the Official Information Act.



## KAHAWAI (KAH 1-10)

Figure 1: Map showing the boundaries of the KAH (KAH 1-10) (*Arripis trutta* and *Arripis xylabion*) Quota Management Areas (QMAs).



### Key Issues to be considered

- 7 The key issues to be considered for kahawai are:
  - a) Kahawai were introduced into the Quota Management System (QMS) on 1 October 2004. The Minister of Fisheries (the Minister) set TACs, TACCs and allowances for kahawai stocks prior to that date (the 2004 decisions).
  - b) When the Minister set the TACs he stated that he was concerned about the state of kahawai stocks given that the combined estimates of recreational catch, customary catch, fishing-related mortality and reported commercial landings exceeded the best available yield estimates, based on the 1997 stock assessment. He noted that these 1997 yield estimates are outdated and uncertain. However, they remained as reference points of sustainable yield for kahawai.
  - c) The Minister was also aware of the widespread perception of recreational fishers that there is a marked decline in the amount and size of kahawai available. While recognising that anecdotal information was uncertain he

considered these perceptions to be important given the size of the recreational fishery.

- d) TACs totalling 7 612 tonnes were set. In the absence of reliable estimates of sustainable yield, the TACs were based on a 15% reduction to levels of use estimated at the time of introduction in 2004. Non-commercial allowances were set equivalent to 58%, and TACCs equivalent to 40%, of combined TACs (2% is allowed for incidental mortality).
- e) The Minister considered that the TACs should at least maintain and preferably provide for an increase in the kahawai biomass.
- f) The Minister indicated last year that he wanted to review the TACs for kahawai for the 2005–06 fishing year. The purpose of this review was to look at options for providing greater confidence that the TACs would provide for an increase in biomass.
- g) The current status of kahawai stocks remains uncertain and it is unknown whether stocks are currently above or below the biomass that can produce the maximum sustainable yield ( $B_{MSY}$ ).
- h) There is no new stock assessment information available to assist in determining sustainability of current TACs. The research programme for kahawai is intended to provide information for a stock assessment of kahawai in 2007.
- i) A significant stakeholder in the fishery, the recreational sector, remains concerned that current measures are insufficient for ensuring that kahawai stocks increase in size. Recreational fishers consider that kahawai stocks have declined in abundance, availability and size of fish in the main stocks over the long term and in recent years. This view has not changed during the course of the current year. Some fishers do not believe the measures taken in 2004 were sufficient to appropriately manage risk to the stock of further decline and were inadequate for promoting any increase in the fishery.
- j) In contrast commercial fishers consider the 2004 decisions to be overly conservative and say that there is no evidence of declining kahawai stocks over recent years.
- k) Some research from the current research program was fast tracked in support of a review of catch limits and allowances for kahawai in 2005. As a result some new information is now available.
  - i) The size and age of the recreational fish sampled has remained relatively constant.
  - ii) Since 1991, recreational catch rates have fluctuated in the three regions sampled (Northland, Bay of Plenty and Hauraki Gulf), and there is some evidence of declining catch per trip in the Hauraki Gulf in recent years.
  - iii) A preliminary relative index of abundance for part of KAH 1 between 1977–78 and 2003–04 shows no agreed trend in biomass.
- l) For the most part this new information consists of preliminary findings or is limited in scope to certain geographic areas of the fishery only.

- m) A consideration for this fishery would be to adopt a specific management objective for managing the stock above  $B_{MSY}$ . MFish notes that both commercial and non-commercial submissions supported this concept in 2004. There is currently insufficient information to specify a target stock size or the catch levels necessary to achieve any particular target level.
- n) The Minister can take the following matters into account when reviewing the TAC:
- uncertainty in information on status of kahawai stocks;
  - anecdotal information on decline in abundance from some non-commercial fishers;
  - value of the fishery to recreational and commercial users;
  - desire to provide a greater level of certainty that the stock biomass will at least maintain its current level and preferably provide for an increase in biomass;
  - socio-economic information including the potential impacts and benefits to all sectors; and,
  - availability of new information to support a stock assessment of kahawai in 2007.
- o) There are two options proposed in this review. The first is to maintain the status quo TACs allowances and TACCs pending new scientific information to support a change. This option assumes that current catch limits will at least maintain and preferably provide for an increase in the kahawai biomass. The second option is to reduce TACs to take account of the uncertain information surrounding the status of kahawai stocks and achieve greater probability that these will increase pending a future reassessment of stock status. Adopting any option to reduce TACs would require that the decrease be based on a nominal percentage reduction.
- p) Should the Minister decide to reduce the TAC and allowances there is no proposal to apply additional management controls to further constrain recreational catch. Recreational fishers consider the catch will be within the current allowance without additional management controls. There is no new information to suggest that a revised recreational allowance would be exceeded with current management controls and at current levels of abundance.
- q) A research project is underway to estimate recreational catches of kahawai in KAH 1 in 2004–05 and a similar programme is proposed for KAH 8 in 2006–07. If new information comes to hand that suggests the need to constrain recreational catches to ensure that they remain within the allowances set for the fishery, management measures will be proposed at that time.

## TAC options

- 8 There are two TAC options proposed in this review. The first is to maintain the status quo TACs allowances and TACCs pending new scientific information to support a

reassessment in 2007. This option assumes that current catch limits will at least maintain or provide for an increase in kahawai biomass.

- 9 The second option is to reduce TACs in all kahawai stocks by 10%. This option takes account of the continued uncertain information surrounding the status of kahawai stocks and will provide a greater level of certainty of maintaining or increasing biomass.
- 10 The following management options are proposed.

**Table 1: Options for setting TACs, allowances and TACCs for kahawai.**

<b>Stock</b>	<b>TAC</b>	<b>Customary allowance</b>	<b>Recreational allowance</b>	<b>TACC</b>	<b>Fishing-related incidental mortality</b>
<b>KAH 1</b>					
Option 1 (Status quo)	3 685	550	1 865	1 195	75
Option 2	3 315	495	1 680	1 075	65
<b>KAH 2</b>					
Option 1 (Status quo)	1 705	205	680	785	35
Option 2	1 530	185	610	705	30
<b>KAH 3</b>					
Option 1 (Status quo)	1 035	125	435	455	20
Option 2	935	115	390	410	20
<b>KAH 4</b>					
Option 1 (Status quo)	16	1	5	10	0
Option 2	14	1	4	9	0
<b>KAH 8</b>					
Option 1 (Status quo)	1 155	125	425	580	25
Option 2	1 ,040	115	385	520	20
<b>KAH 10</b>					
Option 1 (Status quo)	16	1	5	10	0
Option 2	14	1	4	9	0

## Rationale for management proposal

- 11 Kahawai stocks are managed under s 13 of the Fisheries Act 1996. The purpose and principles require decision makers to provide for utilisation while ensuring sustainability. Section 13 provides that the biomass of the stock should be managed at or above a level that can produce MSY. If the biomass of a stock is below the level that supports the MSY, s 13 requires the Minister to rebuild the stock to at or above that level within a period appropriate to the stock (having regard to biological characteristics, socio-economic factors and interdependence of stocks). The Minister has a choice for stocks whose biomass is currently above the level that will produce MSY:
  - to move the stock towards MSY at a way and rate considered appropriate for the stock; or
  - maintain the biomass at a level above that which would support the MSY having regard to interdependence of stocks.
- 12 In considering the target biomass the Minister must have regard to biological factors, interdependence of stocks and socio-economic impacts.

- 13 The key benefits of management of stocks above the biomass that support the MSY are:
- the increased availability of fish; and
  - the increased size of fish.
- 14 Stocks managed above  $B_{MSY}$  are more abundant, providing greater opportunity for catches, in addition, there are generally a wider variety of sizes (age classes) of fish available in the population. Both of these factors increase non-commercial enjoyment from a fishery. Efficiency gains in commercial harvesting can also be expected. However, management of the stocks above  $B_{MSY}$  does not provide an opportunity to maximize yield from the fishery.
- 15 In determining the target level for the biomass of this stock, the Minister should, in line with his obligations under the purpose and principles, consider the relative benefit to stakeholders likely to be obtained under management at or above the biomass that will support the MSY. This analysis should include consideration of the trade off between the benefits associated with increased availability and size of fish and reduced yield. Although not clear cut, increased availability and size range of fish will likely benefit the recreational sector, whereas the increased yield if the biomass was managed at a level that could produce the MSY will likely benefit the commercial sector.
- 16 If one option is likely to provide greater benefit for one sector over another the Minister should consider whether such a benefit is reasonable.
- 17 MFish consider such a decision would likely be reasonable where:
- a) Stakeholders generally agree to management of the biomass above the level that can produce the MSY.
  - b) Where the available information suggests that greater utilisation benefit would result and could be achieved by managing according to the preference of the sector that values the resource the most.
- 18 In the case of kahawai submissions in 2004 indicated there was broad sector agreement to managing the biomass above a level that can produce MSY.
- 19 There is quantitative valuation available to show the relative value of the kahawai fishery to each sector. MFish has estimates of how much recreational fishers value kahawai based on non-market estimation techniques (contingent valuation to determine the willingness of a fisher to pay to catch a kahawai. Commercially caught kahawai is a relatively low value species. These data suggest that recreational fishers value the fishery more highly than commercial fishers.
- 20 Ideally the management objective would be developed as part of discussion with stakeholders on a management plan. However, at this stage there is no proposal to develop a management plan for the kahawai fishery.
- 21 There is no reliable estimate of sustainable yield for kahawai and no reliable information on the relationship between current biomass and that biomass that will

support the MSY. In the absence of reliable estimates of sustainable yield, TACs set for kahawai in 2004 were based on a proportion of estimates of the current use of the kahawai fishery.

- 22 The estimates of current use of the fishery immediately prior to introducing kahawai into the QMS (assessed at 8 767 tonnes) exceeded yield estimates based on the 1997 stock simulation model (refer to Appendix 1). Yield estimates of between 7 600 and 8 200 tonnes and a revised yield estimate submitted by Non-Commercial fishers of 6 900 tonnes were considered as reference points. While these estimates were considered to be outdated and uncertain they remain the only reference points of sustainable yield for kahawai. TACs totalling 7 612 tonnes were set that were 15% less than the level of use prior to introducing kahawai into the QMS.
- 23 The current research programme for kahawai is intended to provide information for a reassessment of kahawai stocks in 2007. The Minister asked MFish to fast-track research from the current research program in support of a review of catch limits and allowances in 2005. As a result of the fast tracking, some new information is now available and time series extended with recent data but for the most part this new information consists of preliminary findings or is limited in scope to certain parts of the fishery only (refer to Appendix 1).
- 24 MFish notes that in the main recreational fisheries in KAH 1, recreational claims of declining sizes of kahawai are not supported by catch sampling and age structure data from the recreational fishery, which has been closely monitored since 2000–01. The size and age of the fish sampled has remained relatively constant since 2000–01 with a broad age structure evident in the catches. These results are not consistent with a rapid decline in abundance. However, MFish notes that catch selectivity may influence these indicators.
- 25 The average number of kahawai caught per trip in KAH 1 is highest in the Bay of Plenty, and lowest in the Hauraki Gulf. Since 1991, catch rates have fluctuated in all three regions sampled, although there is some evidence of declining catch per trip in the Hauraki Gulf in recent years.
- 26 A preliminary relative index of abundance for kahawai has been developed for part of KAH 1 based on aerial sighting data. Trends vary depending on assumptions made about the model. There is no agreed interpretation of trends.
- 27 Given the Minister's desire to review the stock in 2005; two options are presented:
  - a) retain the status quo; or
  - b) reduce the current TACs by 10%.
- 28 If the Minister placed greater weight on the following factors he may decide to retain the current TAC:
  - the equivocal nature of information on sustainability concerns;
  - the socio-economic impacts of any reduction to existing catch;

- availability of new information in 2007 to support a revised stock assessment; and,
  - assumption that kahawai stocks are likely to be at or above  $B_{MSY}$  or moving in that direction;
- 29 Alternatively the Minister may place weight on the following factors and decide to reduce the TACs:
- uncertainty in information on status of the stock;
  - anecdotal information on decline in abundance from some non-commercial fishers;
  - value of the fishery to recreational and commercial users; and,
  - desire to provide a greater level of certainty that the stock biomass will at least maintain its current level and preferably provide for an increase in biomass.
- 30 There is currently insufficient information to determine where the stock is relative to the target stock size or the catch levels necessary to achieve any particular target level. Therefore any option for reducing TACs would be based on a nominal percentage. MFish proposes that TACs be reduced to 6 848 tonnes. This combined level of TACs is at the lower end of the range of reference points of yield considered during the 2004 review of kahawai catch limits and allowances.

## **TAC**

### **KAH 1**

- 31 MFish has proposed two options for setting the KAH 1 TAC as outlined in table 1.

#### Option 1 (Status quo)

- 32 Retaining the current TAC for KAH 1 of 3 685 tonnes.
- 33 This option assumes that, in the absence of confirmed information on fisheries trends and stock size, current landings are sustainable, and the KAH 1 stock is likely to be at or above  $B_{MSY}$  or be moving in that direction. This position is uncertain, and is not supported by anecdotal information from recreational fishers. Anecdote from the commercial fishery supports this option.

#### Option 2 (Reduced)

- 34 A TAC of 3 315 tonnes is proposed. This option is based on a 10% reduction of the TAC to provide for greater certainty in achieving a target stock level at or above  $B_{MSY}$ . There is no information to suggest if, or how rapidly, the stock will increase under this option. However, MFish considers that a TAC set at a level lower than the current TAC will provide greater opportunity for the stock to increase in abundance despite the uncertainty in information.

- 35 There are social and economic considerations associated with adopting this option. There will be a loss in value to commercial fisheries from reduced landings. These are discussed in more detail in the socio-economic section.

### *KAH 2*

- 36 MFish has proposed two options for setting the KAH 2 TAC as outlined in table 1.

#### Option 1 (Status quo)

- 37 Retaining the current TAC for KAH 2 of 1 705 tonnes.
- 38 This option assumes that, in the absence of confirmed information on fisheries trends and stock size, current landings are sustainable, and the KAH 2 stock is likely to be at or above  $B_{MSY}$  or be moving in that direction. This position is uncertain, and is not supported by anecdotal information from recreational fishers. Anecdote from the commercial fishery supports this option.

#### Option 2 (Reduced)

- 39 A TAC of 1 530 tonnes is proposed. This option is based on a 10% reduction of the TAC to provide a greater certainty of achieving a target stock level at or above  $B_{MSY}$ . There is no information to suggest if, or how rapidly, the stock will increase under this option. However, MFish considers that a TAC set at a level lower than the current TAC will provide greater opportunity for the stock to increase in abundance despite the uncertainty in information.
- 40 There are social and economic considerations associated with adopting this option. There will be a loss in value to commercial fisheries from reduced landings. These are discussed in more detail in the socio-economic section.

### *KAH 3*

- 41 MFish has proposed two options for setting the KAH 3 TAC as outlined in table 1.

#### Option 1 (Status quo)

- 42 Retaining the current TAC for KAH 3 of 1 035 tonnes.
- 43 This option assumes that, in the absence of confirmed information on fisheries trends and stock size, current landings are sustainable, and the KAH 3 stock is likely to be at or above  $B_{MSY}$  or be moving in that direction. This position is uncertain, and is not supported by anecdotal information from recreational fishers. Anecdote from the commercial fishery supports this option.

#### Option 2 (Reduced)

- 44 A TAC of 935 tonnes is proposed. This option is based on a 10% reduction of the TAC to provide a greater certainty of achieving a target stock level at or above  $B_{MSY}$ . There is no information to suggest if, or how rapidly, the stock will increase under this option. However, MFish considers that a TAC set at a level lower than the current

TAC will provide greater opportunity for the stock to increase in abundance despite the uncertainty in information.

- 45 There are social and economic considerations associated with this option. There will be a loss in value to commercial fisheries from reduced landings. These are discussed in more detail in the socio-economic section.

#### *KAH 4 (Status quo)*

- 46 MFish has proposed two options for setting the KAH 4 TAC as outlined in table 1.

#### Option 1 (Status quo)

- 47 Retaining the current TAC for KAH 4 of 16 tonnes.
- 48 This option assumes that, in the absence of confirmed information on fisheries trends and stock size, current landings are sustainable, and the KAH 4 stock is likely to be at or above  $B_{MSY}$  or be moving in that direction. This position is uncertain, and is not supported by anecdotal information from recreational fishers. Anecdote from the commercial fishery supports this option.

#### Option 2 (Reduced)

- 49 A TAC of 14 tonnes is proposed. This option is based on a 10% reduction of the TAC to provide a greater certainty of achieving a target stock level at or above  $B_{MSY}$ . There is no information to suggest if, or how rapidly, the stock will increase under this option. However, MFish considers that a TAC set at a level lower than the current TAC will provide greater opportunity for the stock to increase in abundance despite the uncertainty in information.
- 50 There are probably only minor social and economic considerations associated with this option. These are discussed in more detail in the socio-economic section.

#### *KAH 8*

- 51 MFish has proposed two options for setting the KAH 8 TAC as outlined in table 1.

#### Option 1 (Status quo)

- 52 Retaining the current TAC for KAH 8 of 1 155 tonnes
- 53 This option assumes that, in the absence of confirmed information on fisheries trends and stock size, current landings are sustainable, and the KAH 1 stock is likely to be at or above  $B_{MSY}$  or be moving in that direction. This position is uncertain, and is not supported by anecdotal information from recreational fishers. Anecdote from the commercial fishery supports this option.

#### Option 2 (Reduced)

- 54 A TAC of 1 040 tonnes is proposed. This option is based on a 10% reduction of the status quo recreational allowance and TACC to provide a greater certainty of achieving a target stock level at or above  $B_{MSY}$ . There is no information to suggest if,

or how rapidly, the stock will increase under this option. However, MFish considers that a TAC set at a level lower than the current TAC will provide greater opportunity for the stock to increase in abundance despite the uncertainty in information.

- 55 There are social and economic considerations associated with adopting this option. There will be a loss in value to commercial fisheries from reduced landings. MFish notes that ACE will primarily be required to cover the bycatch of fishing for other species in KAH 8, if option 2 is adopted. This is discussed in more detail in the socio-economic section.

### *KAH 10 (Status quo)*

- 56 MFish has proposed two options for setting the KAH 10 TAC as outlined in table 1.

#### Option 1 (Status quo)

- 57 Retaining the current TAC for KAH 10 of 16 tonnes.
- 58 This option assumes that, in the absence of confirmed information on fisheries trends and stock size, current landings are sustainable, and the KAH 10 stock is likely to be at or above  $B_{MSY}$  or be moving in that direction.

#### Option 2 (Reduced)

- 59 A TAC of 14 tonnes is proposed. This option is based on a 10% reduction of the TAC to provide a greater certainty of achieving a target stock level at or above  $B_{MSY}$ . There is no information to suggest if, or how rapidly, the stock will increase under this option. However, MFish considers that a TAC set at a level lower than the current TAC will provide greater opportunity for the stock to increase in abundance despite the uncertainty in information.
- 60 There are probably only minor social and economic considerations associated with this option. These are discussed in more detail in the socio-economic section.

## **Allowances and TACC**

- 61 The TAC is the primary sustainability measure for a fish stock and is intended to include all sources of fishing and fishing-related mortality. When setting any TAC, a TACC must be set, and allowances determined for the Māori customary and recreational fishing interests and for any incidental fishing related incidental mortality.
- 62 The 1996 Act stipulates a process by which the TAC is to be allocated. However, no explicit statutory mechanism provides guidance as to the apportionment of the TAC between sector groups either in terms of a quantitative measure or prioritisation of allocation. The nature of the Ministers discretion is broad. Subject to the constraints of the scope of the Act, the Minister is able to take into account such factors he/she considers to be relevant to his/her decision and determine the weight he/she considers to be appropriate 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 his or her decision.

63 MFish has set out a list of factors that it considers relevant to any allocation decision in the Statutory Considerations and Policy Guidelines section of the Initial Position Paper on the Review of Sustainability Measures and Other Management Controls for the 2005–06 Fishing Year. In addition, MFish has been guided by judicial decisions that consider the issue of allocation of the TAC. In particular, case law has identified that:

- a) all stakeholders' demands for a stock need to be considered;
- b) the needs of any particular sector do not need to be fully provided for when specifying an allowance;
- c) the existing ratio between commercial and recreational interests can be varied;
- d) 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
- e) it is not unreasonable for commercial and recreational fishers to share some of the "pain" from a reduction in the TAC.

64 To help develop advice on kingfish – also a shared fishery – MFish categorised the broad range of issues the Minister could consider into two basic allocations frameworks. Both approaches are consistent with the Act, and are not necessarily mutually exclusive. Detailed information on each approach is contained in the statutory interpretation section of the Initial Position Paper. In summary the broad approaches are as follows:

- a) A claims-based approach, where allowances are set on the basis of a consideration of the legitimacy of claims to the resource. Generally these claims are based on some form of 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 flow from the allowance made to a particular fishing sector. This approach tends to give a higher priority in allowance setting to those sectors that value the resource most. As such it tends to have a focus on future, rather than past, uses and values that sectors have placed on a species or stock.

65 The Minister may adopt elements of both approaches in reaching a decision on allowances. Two options are available for kahawai:

- A proportional approach where allowances are reduced proportionally based on existing shares of the TAC; or
- A non-proportional approach where preference is given in the allowance to one sector.

66 Kahawai is a shared resource. Non-commercial removals contribute approximately 58% percent of the existing TAC. MFish generally supports a proportional approach to allocation of shared fisheries on the basis that all stakeholders should contribute to

the increasing the abundance of the resource. This position assumes that all sectors are to a lesser or greater degree responsible for the present state of the fishery. Further, it assumes that the level of catch reduction achieved from each contributing sector is of some consequence to the overall reduction required. However, the Act allows the Minister broad discretion. A preference may be provided to one sector over another when making a determination on the allowances that should be set before a decision on the TACC.

67 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. In view of the sustainability concerns for kahawai MFish proposes to reduce customary allowances in this case.

68 Option 2 proposes a 10% reduction in existing use of kahawai stocks. MFish proposes TACCs and allowances that are derived from a proportion of the existing level of TACCs and allowances (proportional approach).

### ***Maori customary allowances***

69 Proposals for Maori customary allowances in tonnes for each QMA are set out in Table 1. Kahawai is known to be a species of customary importance to Maori. MFish notes that the implementation of customary regulations will improve the ability to monitor the customary harvest in relation to the allowances set for the fishery.

#### ***Option 1 (Status quo)***

70 To retain current allowances for customary Maori fishing for all kahawai stocks. .

#### ***Option 2 (Reduced)***

71 To reduce the allowances for Maori customary fishing for all fishstocks by 10%. Based on current anecdote from the fishery MFish assesses that there will be limited socio-economic impacts associated with adopting this option.

### ***Recreational fishing allowances***

72 Proposals for recreational allowances in tonnes for each QMA are set out in Table 1.

#### ***Option 1 (Status quo)***

73 To retain current allowances for recreational fishing for all kahawai stocks.

#### ***Option 2 (Reduced)***

74 To reduce the allowances for recreational fishing for all fishstocks by 10%. Based on current anecdote from the fishery MFish assesses that there will be limited socio-economic impacts associated with adopting this option.

## ***Management of recreational catch***

- 75 Potential management measures to constrain recreational kahawai catches include the imposition of a minimum legal size (effective for some species such as kingfish) or the setting of a separate and reduced daily bag limit.
- 76 At present there is no minimum legal size limit for kahawai taken recreationally and recreational daily bag limits for kahawai are based on a mixed bag of species with a limit of 20 per person per day (an exception is the Southern Fishery Management Areas in which an individual daily limit of 15 applies). Within the mixed bag limit, if kahawai is the only species taken, then up to 20 may be taken per person per day.
- 77 The current recreational allowances are based on levels of utilisation estimated by telephone diary harvest surveys in 1999/00. The need for additional management measures (reducing bag limits) was considered as part of the 2004 decisions. However, recreational fishers said that they were unable to catch kahawai up to the allowances set (even though these were reduced by 15%) because of declining availability of kahawai to recreational fishers. The Minister accepted this view at that time.
- 78 The telephone diary survey technique and its associated estimates have been subject to intensive recent review. The results of all survey are now subject to significant qualifications (refer section of Appendix I). Most importantly 1999–2000 estimates are thought to be considerable over-estimates for some stocks. At the time initial allowances for recreational fishing were set for kahawai MFish had no information to suggest that this was the case for this species.
- 79 Although highly localised and temporally limited, recent information from Hauraki Gulf surveys of recreational catch supports the assertion that recreational harvest in this area over the summer of 2003–04 was low. It is unknown whether changes in abundance of the stock, availability due to environmentally induced effects, previous catch estimates being too high, or other seasonal effects are responsible for this recent low catch of kahawai in this area.
- 80 In the context of this review it is unknown if there is a need for any additional management measures to constrain recreational catch at this time, even at the reduced level of recreational allowances proposed for option 2. Current anecdote suggests that recreational fishers are unable to catch to the level of the current allowances set for the fishery and even at reduced allowances this situation would prevail. Recent research information shows that catch and catch per unit of effort for kahawai was low for the Hauraki Gulf during the 2003–04 summer. This trend is not apparent in other areas of the KAH 1 fishery and no recent information is available for other stocks.
- 81 MFish is concerned to ensure that management measures are in place for protecting the integrity of TACs set for QMS stocks but, in this case, MFish proposes to review the need for additional management measures for constraining the recreational catch of kahawai to allowances as soon as new information on the size of the recreational catch at the level of fishstocks becomes available.
- 82 MFish has now adopted alternative methods from diary harvest surveys for better estimating recreational catch. A research project is underway to estimate recreational

catches of kahawai in KAH 1 in 2004–05 and a similar programme is proposed for KAH 8 in 2006-07. Recreational research undertaken during the 2004–05 year for the whole of the KAH 1 fishery will form the initial basis of this consideration. Extending the coverage of this survey to other fishstocks is a priority to ensure that the total kahawai recreational catch is quantified as soon as is practical.

## **TACCs**

83 Proposed TACCs in tonnes for each QMA are set out in Table 1.

### Option 1 (Status quo)

84 To retain current TACCs for all kahawai stocks.

### Option 2 (Reduced)

85 To reduce the TACCs for all fishstocks by 10%. MFish assesses that there will be socio-economic impacts associated with adopting this option. These impacts are considered in the following section.

## ***Management of commercial landings***

86 No change is proposed to other management controls on commercial fishing including deemed values for kahawai.

## ***Loss of economic return***

87 There are a number of possible economic effects from setting TACCs at the levels proposed under option 2. Among those that are assessable, lost opportunity costs (associated with further limitations on commercial catch) need to be weighed against the uncertainty in current stock status, the value of kahawai as a shared fishery and the importance of this species in an ecological context.

88 MFish has evaluated the potential economic impact of adopting option 2 on Industry in more detail. MFish notes that these impacts will add to those associated with adjusting to the current management measures for kahawai.

## Points of comparison

89 MFish has used points of comparison to compare the socio-economic impacts of adopting option 2 as follows:

- a) Current TACCs; and
- b) Average bycatch.

90 The current TACCs form the basis of the status quo fishery. Accordingly it is a useful point of comparison to the reductions in TACC proposed.

91 MFish notes that adopting option 2 would not reduce any TACC below the average landings of bycatch in any fishstock.

- 92 A further point of comparison for any potential economic impact is the constraint a shortage of ACE for bycatch species might impose on target fisheries. Kahawai bycatch at moderate levels is associated with target fishing for jack mackerels, trevally, snapper and grey mullet. As most of the bycatch of kahawai is in the purse seine fishery for jack mackerels and the trawl fisheries for trevally and snapper incidental bycatches of kahawai can probably not be actively managed by fishers.
- 93 Levels of reported bycatch between 1999-00 and 2004-05 are less than that reported between 1995-96 and 1998-99 and are more stable. The more recent values are based on fishing methods and fishing patterns in use in the current fishery. Accordingly average bycatch levels for the five most recent fishing years reported have been used for this point of comparison.

**Table 2: Points of comparison (tonnes of kahawai) for evaluating annual loss of economic return**

<b>QMA</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>8</b>	<b>10</b>	<b>Total</b>
Current TACCs	1 195	785	455	10	580	10	3 035
Average bycatch (2001-04)	350	180	100	<1	470	<1	1 100

### Estimates of loss of economic return

- 94 Assessing loss of economic return for kahawai TACC options is problematic. MFish has therefore provided two alternative reference points to consider with respect to the choice of TACC options. MFish has used port prices and recent ACE prices to assess opportunity costs of TACC options with respect to these reference points. Accordingly, MFish has estimated the potential loss of economic return with respect to the points of comparison above for each of the following factors:
- a) loss in earnings from kahawai (based on port price); and
  - b) loss in ACE value.
- 95 Commercial impacts can be measured as direct opportunity costs. A tonne of kahawai has a value and any reduction in tonnage for the commercial sector as a result of a lower TACC can be measured as an opportunity cost. MFish considers that impacts can best be measured by asset value and by forgone annual earnings as provided by the port price and ACE price of kahawai (MFish notes that port prices will overestimate annual earnings as these include handling costs).
- 96 There may be a change in quota value, however the degree to which it will change is an empirical question and difficult to estimate without a full economic assessment of the fishery. Since the quota value is the opportunity cost not to harvest, in the long term the quota value may increase as the stock abundance improves even at a reduced TACC setting.
- 97 MFish has evaluated loss of economic return of adopting option 2 for each fishstock against the points of comparison.
- 98 Taking the difference between option 2 TACCs and the point of comparison and multiplying this difference by the port prices used in the setting of the 2004–05 levy order (\$0.8805 for KAH1 and \$0.8125 for the other stocks) estimates the forgone annual earnings associated with landing fish and adopting option 2.

- 99 Taking the difference between the option 2 TACCs and the point of comparison and multiplying by the 2004–05 ACE value per tonne for all stocks estimates the forgone annual earnings (quota owners only) associated with leasing ACE and adopting option 2. The ACE values range between 0.13 \$/kg and 0.37 \$/kg depending on fishstock.
- 100 For associated fisheries, economic impacts can occur when ACE is not available to cover the inevitable bycatch associated with other target fisheries. Impacts include the payment of deemed values for any kahawai taken above ACE. The potential for deemed value costs is influenced by the circumstances of individual fishers with respect to their ACE holdings of kahawai, as well as a fisher’s ability to avoid kahawai as a bycatch.
- 101 An alternative to the payment of deemed value when there is insufficient ACE to cover bycatch is that fishers could stop fishing for their target species. MFish is not aware of any current situation where the landing of target species is constrained by the level of bycatch TACCs. Typically when landings are taken in excess of the bycatch TACC deemed values are paid. Accordingly, MFish does not consider there will be any potential costs of foregone fishing for associated species due to kahawai bycatch limitations.
- 102 The assessment of the potential economic loss associated with TACC options is summarised in Table 3.

**Table 3: Assessment of potential loss of economic return for TACC options with forgone return in brackets (in thousands of \$)**

Potential Impact	Point of comparison	KAH 1	KAH 2	KAH 3	KAH 4	KAH 8	KAH 10
<b>Current TAC</b>							
Port price	Option 2	(106)	(65)	(37)	(<1)	(49)	(<1)
Loss in leased ACE	Option 2	(36)	(16)	(7)	(~0)	(22)	(~0)

- 103 Adopting option 2 would reduce TACCs by about 305 tonnes in comparison to the status quo. The reduced TACC means that less ACE will be available, and therefore the price of ACE may increase. The long-term value of the quota asset due to the effect of any change in TACC is unknown.

### ***Allowance for other sources of fishing-related mortality***

- 104 There is no information on the current level of illegal catch. The Report from the Fishery Assessment Plenary<sup>1</sup> states that there is no information on other sources of mortality apart from juvenile kahawai, which may suffer from habitat degradation in estuarine areas. Nevertheless, MFish notes that incidental fishing related mortality is likely from all sectors in the fishery. MFish proposes retaining an arbitrary 2% of the

<sup>1</sup> Report from the Fishery Assessment Plenary, May 2005: stock assessments and yield estimates Part 1: Albacore to Moonfish Compiled by K.J. Sullivan, P.M. Mace, N.W. McL. Smith, M.H. Griffiths, P.R. Todd, M.E. Livingstone, S.J. Harley, J.M. Key & A.M. Connell. May 2005.

TAC as a basis for providing an allowance for all other sources of fishing relating mortality.

## **Other Management Measures**

### ***Voluntary and regulatory method based fishing restrictions***

- 105 The recreational sector believes that there is conflict with commercial fishing for kahawai, particularly with purse seiners and set netters. These concerns are currently mitigated by voluntary agreements<sup>2</sup> and by an outcome of the set net review<sup>3</sup>.
- 106 There is currently no provision for considering spatial allocation to manage utilisation of a fishery within the process of setting sustainability measures and therefore continued voluntary arrangement between sectors to retain these measures for kahawai might be necessary with kahawai in the QMS.
- 107 Area restrictions could form part of a determination to resolve a dispute between fisheries sectors. Part VII of the Act provides for the determination of such disputes. It applies to disputes over the effects of fishing by one party on the fishing of another. It does not apply to disputes about ensuring sustainability, or about the effects of fishing authorised under Part IX (Taiapure- Local Fisheries and Customary Fishing). The Minister has determined an approved procedure for resolving disputes.

## **Future Management**

### ***Recreational harvest levels***

- 108 More research, and agreement on the value of existing information, is required for kahawai recreational catch estimates. Effective management of the stock is being compromised by this lack of information. MFish has contracted further recreational research using an alternative aerial and boat ramp survey technique for key recreational species. It is currently being applied in KAH 1 and if successful will be considered for application in other areas of the fishery.

### ***Future stock assessment***

- 109 A stock assessment of kahawai stocks is planned for 2007 and is due to be considered by the Pelagic Stock Assessment Working Group in that year. Notwithstanding which option is chosen during the current review it is possible that sustainability measures for kahawai will again be reviewed during 2007 or 2008. This latter review is likely to have improved information available on stock status and an appropriate target level for kahawai stocks.

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<sup>2</sup> There are voluntary purse seine closures in place in Parengarenga Harbour, Rangaunu Bay, Doubtless Bay, Cavalli Island, The Bay of Islands, Rimariki Island to Bream Head, the Hauraki Gulf, the Bay of Plenty, Cape Runaway to East Cape, Waikahawai Point to Poverty Bay and Hawke Bay to spatially separate non-commercial and commercial sectors. In addition a voluntary moratorium was placed on targeting kahawai by purse seine in the Bay of Plenty between 1 December and the Tuesday after Easter.

<sup>3</sup> An outcome of the set net review was that commercial set netting was prohibited by regulation from 26 locations.

## Statutory Considerations

110 In forming the management proposal the following statutory considerations have been taken into account.

- a) **Section 5** requires that the Act shall be interpreted and all persons exercising or performing functions, duties, or powers under the Act shall act in a manner consistent with New Zealand's international obligations relating to fishing, and the provisions of the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992. MFish considers issues arising under international obligations and the provisions of the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992 (s 5) are adequately addressed in the management options for kahawai.
- b) **Section 8** sets out the purpose of the Fisheries Act 1996 as being “to provide for the utilisation of fisheries resources while ensuring sustainability”. MFish has outlined two options to ensure that management of kahawai is consistent with the purpose of the Act. The options are based on different levels of likelihood of increasing the abundance of the stock. The TACCs, and allowances for recreational and customary fishers are intended to provide for use of the kahawai fishery.
- c) **Section 9** requires that decisions take into account the environmental principles as set out in:
  - i) **Section 9(a)** requires that associated or dependent species should be maintained above a level that ensures their long-term viability. Kahawai fishing is not known to pose a risk to the long-term viability of any associated or dependent species. However, there are recreational concerns about the effect any reduction in kahawai schools might be having on interdependent stocks of predators such as marlin and tuna. Unfortunately, the factors influencing the distribution of highly migratory stocks of these species are complex and not well understood. They do suggest the need for caution in setting sustainability measures for the stock.
  - ii) **Section 9(b)** requires that biological diversity of the aquatic environment be maintained. The major commercial method, purse seining is not known to pose a risk to the maintenance of biodiversity of the aquatic environment.
  - iii) **Section 9(c)** requires that habitat of particular significance to fisheries management should be protected. Habitats of particular significance for fisheries management have been identified for KAH 3 and these have been taken into account when preparing this advice. No other habitats of particular significance for kahawai management have been identified.
- d) **Section 10** requires that all persons exercising or performing functions, duties, or powers under the Act in relation to utilisation or sustainability of fisheries resources, shall take into account the following information principles:
  - i) Decisions should be based on the best available information;
  - ii) Decision makers should consider any uncertainty in the information available in any case;

- iii) Decision makers should be cautious when information is uncertain, unreliable, or inadequate;
- iv) The absence of, or any uncertainty in, any information should not be used as a reason for postponing or failing to take any measure to achieve the purpose of the Act.

The information used to develop proposals for kahawai refers to an assessment of the stock last updated in 1997. There is uncertainty about this assessment (and it is now eight years out of date) however, uncertainty and the absence of information is no reason for failing to provide for utilisation at levels considered to be sustainable, however MFish notes that caution is required in this instance.

The level of non-commercial catch within New Zealand fisheries waters is uncertain with regard to setting allowances for recreational, customary Maori use and other sources of fishing-related mortality. MFish notes, however, that uncertainty in information is not a reason for postponing or failing to take any measure to achieve the purpose of the 1996 Act.

- e) *s 11(1)(a)* requires taking into account effects of fishing on the stock and aquatic environment. These have been taken account for current managements measures (option 1) and are likely to be reduced under option 2.
- f) *Section 11(1)(b)* requires that the Minister takes into account any existing controls that apply to the stock or area. For kahawai stocks, the existing combined TACs of 7,612 tonnes is the key control under consideration for change. There are regulated set net closures and voluntary agreements relating to purse seining that have applied for some time. The later are voluntary agreements and MFish does not consider that they materially affect the Minister's consideration of the proposed TACC and establishment of a TAC. No changes to existing controls beyond the TAC, allowances, and TACC are being proposed.
- g) Natural variability is a relevant factor to consider when setting or altering a sustainability measure (*s 11(1)(c)*). Kahawai populations do not have high levels of natural variability although there may be variable recruitment from year to year. MFish does not consider that the variability of kahawai populations are such that the approach to adjusting a TAC should be different from that proposed.
- h) *Section 11(2A)(b)* requires that the Minister shall take into account any relevant fisheries plan approved under s 11A before setting or varying any sustainability measure. No fisheries plan for kahawai has been approved and MFish is not aware of any fishery plan under development for kahawai.
- i) *Section 11(2A)(a and c)* requires the Minister to take into account any relevant conservation services or fisheries services or decisions not to require such services. No suggestion is made to alter any decision about whether such services are required. A medium term research plan for kahawai stocks identifies the expected research activities over the short term, and significant additional research is planned for the 2005-06 and 2006-07 fishing years leading up to the provision of a stock assessment for kahawai in 2007.

- j) *Section 11(2)(a) and (b)* require that the Minister shall have regard to any regional policy statement, regional plan, or proposed regional plan under the Resource Management Act 1991, and any management strategy or management plan under the Conservation Act 1987 that applies to the coastal marine area and which the Minister considers relevant, before setting or varying any sustainability measure. There are no provisions applicable to the coastal marine area known to exist in any policy statement or plan under the Resource Management Act 1991, or any management strategy or plan under the Conservation Act 1987, that are relevant to the setting or varying of any sustainability measure for any kahawai stock.
- k) As required under **s 11(2)(c)**, MFish has considered how the proposals for KAH 1 meet the requirements of sections 7 and 8 of the Hauraki Gulf Marine Park Act 2000. This Act's objectives are to protect and maintain the natural resources of the Hauraki Gulf as a matter of national importance. MFish considers that, under both options, the management measures for KAH 1 will meet the purpose of the Hauraki Gulf Marine Park Act.
- l) *Section 13(2)* requires that a TAC be set that maintains a stock at or above a level that can produce the maximum sustainable yield (denoted as  $B_{MSY}$ ), or 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 MSY, having regard to the interdependence of stocks. The status of kahawai stocks with respect to a target biomass is unknown. The Minister has indicated a desire to increase abundance above current levels.
- m) The proposed TACs are also based on *section 13(3)*, which requires that the Minister shall have regard to such social, cultural, and economic factors as he considers relevant when he is considering the way in which and rate at which a stock is moved towards or above the  $B_{MSY}$  level under s 13(2)(b) or (c). The economic consequences from decreasing the TAC and TACC are detrimental to the commercial sector, and these costs are assessed in this paper. All sectors are considered to benefit from a more rapid increase in size of kahawai stocks.
- n) *Sections 21(1)(a and b) and (4)(i and ii) and (5)* require that in setting or varying the TACC, the Minister shall have regard to the TAC for the stock and shall allow for Maori customary non-commercial fishing interests, recreational fishing interests, and all other mortality to the stock caused by fishing. When allowing for Maori customary non-commercial fishing interests, the Minister must take into account any mātaitai reserve in the relevant quota management area and any closure or method restriction in the area made under s 186A. Further, when allowing for recreational interests, the Minister shall take into account any regulations that prohibit or restrict fishing in any area and were made under s 311.

The nature of the fishery and the interests of each fishing sector have been considered in proposing the TACC, allowances for recreational and customary interests, and for other sources of fishing-related mortality. No area has been closed or fishing method restricted for customary fishing purposes that is likely to affect fishing for this pelagic fishery. Areas have been closed for customary fishing purposes in KAH 1 (eg Eastern Beach in the Hauraki Gulf) and the KAH 8 stock (eg at Tinopai in the Kaipara Harbour), but the closures

do not affect kahawai fisheries today. No restrictions have been placed on recreational fishing in any area under s 311 of the Fisheries Act. The regulatory restrictions on set netting, and the voluntary restrictions that apply to commercial fishing for protecting recreational interests, have been considered when making recommendations.

## Preliminary Recommendations

111 MFish recommends that the Minister:

### EITHER

- a) **Agrees** to retaining status quo TACs, allowances and TACCs including the decision to make no change to recreational bag limits pending the availability of further information on the recreational take;

### OR

- b) **Agrees** to set a TAC of 3 315 tonnes for KAH 1 and within that TAC set:
  - i) A customary allowance of 495 tonnes;
  - ii) A recreational allowance of 1 680 tonnes;
  - iii) An allowance for other fishing-related mortality of 65 tonnes; and
  - iv) A TACC of 1 075 tonnes.
- c) **Agrees** to set a TAC of 1 530 tonnes for KAH 2 and within that TAC set:
  - i) A customary allowance of 185 tonnes;
  - ii) A recreational allowance of 610 tonnes;
  - iii) An allowance for other fishing-related mortality of 30 tonnes; and
  - iv) A TACC of 705 tonnes.
- d) **Agrees** to set a TAC of 935 tonnes for KAH 3 and within that TAC set:
  - i) A customary allowance of 115 tonne;
  - ii) A recreational allowance of 390 tonne;
  - iii) An allowance for other fishing-related mortality of 20 tonne; and
  - iv) A TACC of 410 tonnes.
- e) **Agrees** to set a TAC of 14 tonnes for KAH 4 and within that TAC set:
  - i) A customary allowance of 1 tonne;
  - ii) A recreational allowance of 4 tonnes;
  - iii) No allowance for other fishing-related mortality; and
  - iv) A TACC of 9 tonnes.
- f) **Agrees** to set a TAC of 1,040 tonnes for KAH 8 and within that TAC set:
  - i) A customary allowance of 115 tonnes;
  - ii) A recreational allowance of 385 tonnes;
  - iii) An allowance for other fishing-related mortality of 20 tonnes; and

- iv) A TACC of 520 tonnes.
- g) **Agrees** to set a TAC of 14 tonnes for KAH 10 and within that TAC set:
  - i) A customary allowance of 1 tonne;
  - ii) A recreational allowance of 4 tonnes;
  - iii) No allowance for other fishing-related mortality; and
  - iv) A TACC of 9 tonnes.
- h) **Agrees** that monitoring recreational catch of kahawai within allowances set for the fishery is a priority.

# APPENDIX ONE

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## Biological information

### *Distribution*

- 112 Kahawai are a schooling pelagic species belonging to the family Arripidae. Kahawai are found around the North Island, the South Island, the Kermadec and Chatham Islands. They occur mainly in coastal seas, harbours and estuaries and will enter the saltwater sections of rivers. A second species, *A. xylabion*, was described during 1993. It is known to occur in the EEZ at the Kermadecs and seasonally around Northland.
- 113 Kahawai live in a variety of habitats, ranging from tidal intrusions into rivers, estuaries and coastal embayments, through to open waters many miles offshore. Juvenile fish (0+ year class) can be found in shallow water over eelgrass meadows and in estuaries. Older year classes of kahawai are often found in surface schools of similarly sized fish often in association with schools of jack mackerels, blue mackerel and trevally.
- 114 Kahawai are presently considered to form one New Zealand wide stock but defined as separate units for the purpose of fisheries management: KAH 1 (FMA 1); KAH 2 (FMA 2); KAH 3 (FMAs 3–8); KAH 9 (FMA 9) and KAH 10 (FMA 10).

### *Age, growth, mortality*

- 115 Biological information suggests no significant differences in the growth rate, and length weight relationship between the sexes. The growth rate is moderate and the maximum-recorded age of kahawai is 26 years. Based on the maximum age, natural mortality (M) is estimated to equal 0.18. A range of 0.15–0.25 is assumed to reflect the lack of precision in the estimate.

### *Reproduction*

- 116 There is no difference in the onset of maturity between the sexes. Kahawai mature at about 40 cm fork length, at which length they are aged between three to five years, and spawning occurs on the seabed (60–100 m deep) in open water. Fecundity estimates have ranged from 210 000 for a 415 mm female to 440 000 for a 507 mm female.

### *Natural variability*

- 117 The natural variability of kahawai stocks is not well described. The species is moderately long lived and accordingly any variability in recruitment is likely to be less pronounced than for a short-lived species.

### *Position in food chain*

- 118 Adult kahawai feed mainly on small pelagic fishes such as anchovy, pilchard and yellow-eyed mullet, but also on pelagic crustaceans, especially krill. Benthic species

such as crabs and polychaetes are also eaten on occasion, especially during the summer months. Juvenile kahawai feed primarily on copepods. Kahawai are known to shift between pelagic and benthic habitats, which is likely to relate in part to feeding behaviour. Larger fish such as kingfish predate kahawai.

## Catch information

### Commercial catch

#### Catch and landing by FMA/QMA

119 Reported commercial landing summaries of kahawai for each FMA/QMA for the fishing years 1983–84 to 2003–04 are given in Table 5.

Table 5. Reported commercial landings (tonnes) of kahawai by FMA/QMA from 1983-84 to 2003-04.

Fishing Year	FMA*/QMA#						Total
	1	2	3	4	8	10	
1983–84*	1 941	919	813	0	547	0	4 266
1984–85*	1 517	697	1 669	0	299	0	4 623
1985–86*	1 597	280	1 589	0	329	0	4 416
1986–87*	1 890	212	3 969	0	253	0	7 525
1987–88*	4 292	1 655	2 947	0	135	0	9 610
1988–89*	2 170	779	4 301	0	179	0	7 431
1989–90*	2 049	534	5 711	0	156	0	8 466
1990–91*	1 617	872	2 950	0	242	0	5 687
1991–92*	2 190	807	1 900	0	199	<1	5 104
1992–93*	2 738	1 132	1 930	0	832	2	6 639
1993–94*	2 069	1 136	1 861	0	98	0	5 164
1994–95*	1 918	1 079	1 290	0	168	0	4 479
1995–96*	1 904	760	1 548	0	237	7	4 502
1996–97*	2 214	808	938	0	194	1	4 158
1998–99#	1 566	729	1 078	0	845	<1	4 468
1999–00#	1 602	928	484	<1	725	0	3 921
2000–01#	1 592	875	403	0	552	0	3 610
2001–02#	1 287	832	152	<1	475	0	2 874
2002–03#	809	1 159	443	0	505	0	2 916
2003–04#	1 579	831	107	0	182	0	2 699

\* CLD data reported on basis of Fisheries Management Area (FMA).

# CLD data prorated to kahawai Quota Management Area (QMA) on basis of statistical area reported.

120 Between 1970–1975 the annual average commercial landings of kahawai was about 500 tonnes, much for use as bait. However, fishing practices evolved to utilise this relatively low value commercial species. Since the mid 1970s purse seine vessels have fished for skipjack tuna around the North Island over summer. For approximately five months of the year (December to May) the fleet, based in Tauranga, targets skipjack tuna (*Katsuwonus pelamis*). When skipjack is no longer available during the winter and spring months the fleet fish for a mix of species including kahawai, jack mackerels (*Trachurus* spp.), and blue mackerel (*Scomber australasicus*). These species are caught ‘on demand’ as export orders are received, in order to reduce product storage costs.

- 121 Reported landings of kahawai progressively increased from 1977–1980 stabilising at about 5 000 tonnes between 1980–1985 and increasing thereafter to peak at 9 600 tonnes during 1987–88.
- 122 For the 1990–91 fishing year, a total commercial catch limit for kahawai was set at 6 500 tonnes, with 4 856 tonnes set aside for purse seining. The introduction of purse seine limits was effective in limiting commercial catches. The reported number of annual purse seining target sets on kahawai was reduced from about 250 sets in 1987–88 prior to the introduction of catch limits to average about 60 sets after their introduction. Purse seine landings reduced from about 8 500 tonnes in 1987–88 to 1 920 tonnes in 2003–04.
- 123 MFish notes that commercial purse seine catch limits applied only to purse seining when kahawai was the target species. Landings in some years in excess of catch limits were mostly due to landings of kahawai as bycatch.

**Table 6: Reported catches (t) by purse seine method and competitive purse seine catch limit (t) from 1990–91 to 2003–04. All data are from weekly reports furnished by permit holders to the Ministry of Fisheries except those for 1993–94 that are from the CELR database.**

Year	FMA 1		FMA 2		FMA 3		FMA 9		FMA 10		Total	
	catch	limit	catch	limit	catch	limit	catch	limit	catch	limit	catch	limit
1990–91	1 422	1 666	493	851	n/a#	2839 *	0	none	0	none	n/a	5 356
1991–92	1 613	1 666	735*	851	1 714	2339	0	none	0	none	4 080	4 856
1992–93	1 547	1 666	795*	851	1 808	2339	140	none	0	none	4 290	4 856
1993–94	1 262	1 200	1 101*	851	1 714	2339	15	§	0	none	4 092	4 390
1994–95	1 225	1 200	821*	851	1 644	2339	0	§	0	none	3 690	4 390
1995–96	1 077	1 200	805*	851	1 146	1500	0	§	0	none	3 028	3 551
1996–97	1 017	1 200	620	851	578	1500	0	§	0	none	2784	3551
1997–98	969	1 200	175	851	153	1500	0	§	0	none	1 297	3551
1998–99	1 416*	1 200	134	851	463	1500	2	§	0	none	2 015	3551
1999–00	1 371*	1 200	553	851	520	1500	0	§	0	none	2 444	3551
2000–01	1 322*	1 200	954*	851	430	1500	0	§	0	none	2706	3551
2002–02	838	1 200	747*	851	221	1500	0	§	0	none	1806	3551
2002–03	514	1 200	819	851	816	1500	0	§	0	none	2149	3551
2003–04	1203*	1 200	714	851	1	1500	0	§	0	none	1918	3551

# By March 1991 when the catch limit was imposed, the purse seine catch had already exceeded 2339 t and the fishery was immediately closed. As the catch already exceeded 2339 t before the Minister's decision was announced, an extra 500 t was allocated to cover kahawai bycatch only.

§ Combined landings from KAH 9 and KAH 1 were limited to 1200 t.

- Purse seine fishery for kahawai closed.

- 124 While national catches decreased during 1991–92, landings in FMA 1 increased and for the 1993–94 the competitive catch limits for purse seining in FMA 1 were reduced from 1 666 tonnes to 1 200 tonnes and purse seine catches reported for FMA 9 were included in this catch limit. Purse seine catch limits were reached in KAH 1 between 1998–99 and 2000–01 and in 2003–04.
- 125 No changes were ever made to the purse seine catch limit of 851 tonnes for FMA 2. The FMA 2 purse seine fishery was closed early each year between 1991–92 and 1995–96 and between 2000–01 and 2001–02.
- 126 The purse seine catch limit for FMA 3 was reduced from 2 339 to 1 500 tonnes from 1995–96. In the past a southern purse seine fleet, based in Nelson, fished exclusively for mackerels and kahawai when fishing in southern waters. With the transfer of these vessels to Tauranga the purse seine target catch of kahawai in KAH 3 has declined from landing 1 500 tonnes in 1995–96 to reporting landings from the east coast South Island (Cloudy Bay to Kaikoura) since the 2002–03 fishing year.

### *Recent catch by fishing method and target species*

- 127 Over the nine years prior to the introduction of kahawai into the QMS, catches by purse seining accounted for 75% of reported landings. Despite purse seine catch limits, catches by purse seining have fluctuated largely because of variable fishing effort in KAH 3. Most kahawai is taken as a target species almost entirely by purse seining apart from a small amount of seasonal fishing by setnet and ring net.
- 128 Trawling, set netting, ring net, bottom pair trawl, longlining, Danish seine/beach seine, and trolling each accounted for lesser amounts. The annual landings of kahawai taken by trawling have remained relatively stable with most of the catches in KAH 8. Set net landings have declined, as a result of set net area closures and changes in fishing patterns.

### **Recreational fisheries**

- 129 Kahawai is one of the fish species most frequently caught by recreational fishers. Bag limits apply but levels (15-20) are unlikely to greatly affect the total harvest. There is no minimum legal size for kahawai.
- 130 A survey of the Value of New Zealand Recreational Fishing undertaken by the South Australian Centre for Economic Studies (SACES) compared kahawai fishers with other recreational fishers. Kahawai anglers are characterised as follows: they go fishing significantly more times per year and are more likely to fish for eating purposes. They are more likely to fish from jetty or land platforms and are slightly more likely to catch and keep additional fish. They have a lower average fishing expenditure, have a higher male participation and are more likely to be a member of a fishing club.
- 131 The estimated number and harvest estimates of kahawai taken by recreational fishers from the various surveys are detailed in Table 4. Recreational harvest estimates by fish stock have been obtained from national telephone diary surveys undertaken in 1996 and 2000, with a follow up survey in 2001. Regional telephone diary surveys were undertaken in 1991/92 in the South Region, 1992/93 in the Central Region and in 1993/94 in the North Region.
- 132 The Recreational Technical Working Group recommends 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: Estimated number of kahawai harvested by recreational fishers by Fishstock. (Source: Tierney et al. 1997, Bradford 1997, Bradford 1998, Boyd & Reilly 2002, and Boyd et al. 2004).**

Survey			KAH 1		KAH 2			
Year	Number	c.v. (%)	Range	Estimate	Number	c.v. (%)	Range	Estimate
1992/93	-	-	-	-	195000	-	245-350	297.5
1993/94	727000	-	920-1035	977.5	-	-	-	-
1996	666000	6	900-1020	960	142000	9	190-240	217
2000	1860000	13	915.6-2474.7	2195.1	1808000	74	769.1-5104.8	2937
2001	1905000	13	-	2248.3	492000	20	-	799.2
Survey			KAH 3		KAH 9			
Year	Number	c.v. (%)	Range	Estimate	Number	c.v. (%)	Range	Estimate
1991/92	231000	-	160-260	210	-	-	-	-
1993/94	6000	-	-	8.4#	254000	-	285-395	340
1996	226000	7	125-145	137	199000	9	195-225	204
2000	413000	16	563.5-771.3	667.4	337000	20	353.8-527.3	440.6
2001	353000	18	-	569.7	466000	24	-	608.5

#No harvest estimate available in the survey report, estimate presented is calculated as average fish weight for all years and areas by the number of fish estimated caught.

### ***Customary catch***

133 No quantitative estimates of customary fishing for kahawai are available. A substantial level of customary catch could be anticipated. Māori have had an historic interest in kahawai and it is an important food source in some localities. The report from the Fisheries Assessment Plenary notes that Maori have concerns with respect to declines in traditional fisheries.

### ***Illegal catch***

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

### ***Other sources of mortality***

135 There is no information on other sources of mortality. MFish notes that currently an arbitrary allowance has been set for incidental mortality on the basis of 2% of Maori customary, recreational and commercial utilisation.

136 Juvenile kahawai may suffer from habitat degradation in estuarine areas.

### **Stock assessment summary**

137 The last assessment for kahawai was undertaken in 1997. A stock reduction model was used to obtain estimates of virgin biomass ( $B_0$ ), the biomass level in 1996 ( $B_{1996}$ ) and maximum constant yield (MCY) for a single nationwide kahawai stock.

138 A number of biological assumptions were used in the model and these are provided below in table 8. The most sensitive input parameter was the natural mortality of kahawai.

**Table 8: Biological parameters used in the model**

Parameter	Symbol	Value
Natural mortality	M	0.2 yr <sup>-1</sup>
Age of recruitment	A <sub>r</sub>	4 yr
Gradual recruitment	S <sub>r</sub>	3 yr
Age at maturity	A <sub>m</sub>	5 yr
Gradual maturity	S <sub>m</sub>	0 yr
von Bertalanffy parameters	L <sub>∞</sub>	60 cm
	K	0.3 yr <sup>-1</sup>
	t <sub>0</sub>	0 yr
Length-weight parameters	a	0.024
Recruitment steepness	B	2.91
Recruitment variability (biomass cal'n)	h	0.95
Recruitment variability (biomass cal'n)	σ <sub>R</sub>	0
Recruitment variability (yield cal'n)	σ <sub>R</sub>	0.6

139 Catch curves derived for purse seine fishing in KAH 2, KAH 3 and KAH 9 during 1991–92 suggested a maximum value for total mortality of 0.31. Therefore, adjusting the maximum fishing mortality in any year so that the average fishing mortality and natural mortality combined was 0.31 probably made the estimates conservative. The average fishing mortality was calculated over the years 1980–92. Results of the model for various values of M (natural mortality) are provided below.

**Table 9 Estimates (tonnes greenweight) of virgin biomass (B<sub>0</sub>) and biomass in 1996 (B<sub>1996</sub>) compared to B<sub>MSY</sub>. F<sub>av</sub> is the average fishing mortality between 1980 and 1992. Estimates are calculated for different values of natural mortality (M).**

M	F <sub>av</sub>	B <sub>0</sub>	B <sub>MSY</sub> /B <sub>0</sub>	B <sub>1996</sub> /B <sub>0</sub>	MCY
0.25	0.063	152,00	13.9%	71.7%	12,600
0.20	0.112	106,000	16.1%	50.0%	7,600
0.15	0.162	93,000	17.8%	28.0%	5,100

140 The above estimates are uncertain depending more on the model assumptions (a single stock, deterministic recruitment and the constraints on fishing mortality imposed) and input data than most New Zealand stock assessments. They may be regarded as conservative estimates as the estimates of total mortality in the model are based on the upper end of the range of values. The catch history is uncertain due to uncertainties in the commercial catch records, and the non-commercial catch history is uncertain with the assumed recent catches based on the 1996 diary harvest survey estimates. Estimates of MCY were calculated for a single national fishstock. MCY = pB<sub>0</sub> where p is determined from a method where the biomass does not go below 20% B<sub>0</sub> more than 20% of the time.

141 If the natural mortality of kahawai is assumed to lie between 0.15 and 0.25 the model estimates MCY ranging between 5,100 and 12,600 tonnes (see table 9).

**Table 10: Summary of yield estimates (tonnes greenweight) and TACs for stocks of kahawai.**

Fishstock		FMA	MCY	TAC
KAH 1	Auckland	1		3 685
KAH 2	Central (East)	2		1 705
KAH3	South-East, Southland, Sub-Antarctic, and Challenger	3, 4, 5 6, & 7		1 035 16
KAH 8	Central (West), Auckland (West)	8 & 9		1 155
KAH 10	Kermadec Is	10		16
Total			5 100–12 600	7 612

- 142 MCY estimates are unreliable and sensitive to key assumptions, but were thought to be conservative.
- 143 There are two species of kahawai present in New Zealand waters, kahawai and northern kahawai. This assessment applies only to kahawai and nothing is known about the other species.

## New Information

- 144 The current research programme for kahawai is intended to provide information for a reassessment of kahawai stocks in 2007. The Minister asked MFish to fast-track research from the current research program in support of a review of catch limits and allowances in 2005.
- 145 Some new information is now available but for the most part this new information consists of preliminary findings or is limited in scope to certain parts of the fishery only. The Pelagic Fisheries Stock Assessment Working Group (PFSAWG) has recently evaluated this information. Preliminary findings of the working group are summarised below:

- a) KAH 2003/01: This project continues a time series of size and age composition data for recreational catches taken in KAH1. The sampling is undertaken in three main areas: east Northland, the Hauraki Gulf and the Bay of Plenty. In the Hauraki Gulf fewer kahawai were encountered in 2004 than in previous years despite increased levels of sampling. The majority of fish landed in the Hauraki Gulf are juveniles, and in recent years, the proportion of larger fish has declined. The age distribution of fish landed in East Northland has broadened over the last four years, with a higher proportion of older fish being caught. There has been less change in the Bay of Plenty, where catch rates are higher and the average age of those fish landed is greatest.

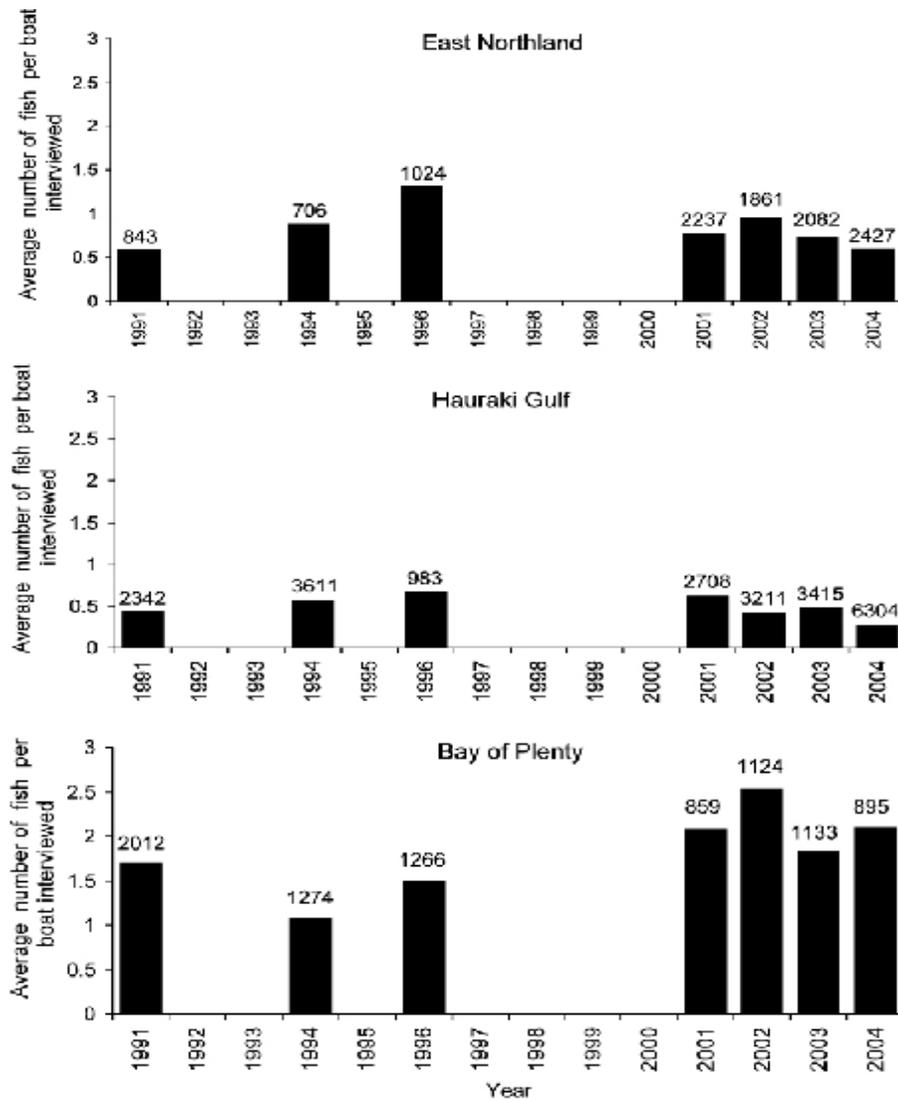
Boat ramp surveys conducted by the Ministry of Fisheries since 1991 provide unstandardised catch rates of kahawai by recreational fishers. It should be noted that these values included trips targeting other species (e.g., snapper) and therefore may be artificially low. The data are presented for the three main strata (East Northland, Hauraki Gulf and Bay of Plenty).

The average number of kahawai caught per trip in KAH 1 is highest in the Bay of Plenty, and lowest in the Hauraki Gulf (Figure 3). Since 1991, catch rates

have fluctuated in all three regions sampled, although there is some evidence of declining catch per trip in the Hauraki Gulf in recent years.

Data describing whether kahawai caught during the trip were released or used as bait were also collected. Most of the kahawai catch was landed, and boat ramp interviewers measured the majority of fish encountered. The highest catch release rates occurred in the Bay of Plenty (9% to 26%) where catch rates were highest, with the lowest release rates in East Northland (5% to 15%). A small proportion of the recreational kahawai catch was reported as being used for bait.

**Figure 3: Catch rates of kahawai caught by recreational fishers in East Northland, the Hauraki Gulf and the Bay of Plenty, as reported by fishers interviewed during boat ramp surveys during the months of January to April since 1991. Numbers above histograms denote the number of fishing parties interviewed.**



- b) PEL 2003/02: A preliminary relative index of abundance for kahawai has been developed based on aerial sighting data. Spatio-temporal tabulation of kahawai sightings by QMA showed that the most extensive and consistent sightings occur in KAH 1. Sightings in KAH 2 were considerably fewer and more variable, and those in KAH 3 were consistent and of good numbers between 1978–79. Kahawai sightings in KAH 8 have been low in most years. Accordingly, an area of the Bay of Plenty was selected for the preliminary index. A ‘combined model’ stepwise multiple regression using a delta-lognormal approach was used to produce time series of standardised annual relative abundance indices based on a measure of sighting rate as the response variable.

Trends in the analysis are variable depending on the assumptions made in standardising the index and assumptions about pilot learning. The combined model incorporates a model of tonnes sighted per hour flown and a model of presence with implied absence of sightings within a flight. The presence/absence data may add more information to the indices, but they require additional work to investigate the most appropriate selection of implied absence data before being usable in a stock assessment model. Additional work on the incorporation of environmental variables, expansion of the index to other areas and further standardisation are also required.

It is important to note that the above analysis is preliminary and the relationship between sightings and stock size are unknown.

- c) REC 2002/02: This project trials a new methodology using aerial over-flights and boat ramp surveys to estimate recreational snapper landings. The programme was expanded to better estimate kahawai landings. It cannot provide recreational harvest estimates for all of KAH 1 as the survey work was only undertaken in the summer of 2004 (temporal limitation) and only covered the Hauraki Gulf (spatial limitation). Based on previous surveys, the Hauraki Gulf was thought to contribute about 17% of the recreational kahawai landings for KAH1. Preliminary estimates of kahawai harvest for the summer months (1 December 2003 to 30 April 2004) suggest landings of 30.5 tonnes, which is considerably lower than previous harvest estimates for the Hauraki Gulf.