Preface

REVIEW OF SUBMISSIONS ON: Import Risk Assessment: Juvenile yellowtail kingfish (*Seriola lalandi*) from Spencer Gulf Aquaculture, South Australia

9 September 2004

MAF was approached in 2002 with a request to import juvenile yellowtail kingfish from south Australia. There was no import health standard to cover such an importation and before one could be developed a risk analysis was required.

The importer elected to commission a private risk analysis due to existing demands on MAF's risk analysis resources.

In December 2002 the risk analysis was subjected to peer review by MAF staff as well as technical experts outside MAF. After addressing the comments from reviewers the risk analysis was made available for public consultation in February 2003.

Submissions from the public were forwarded to the analyst in April 2003. The analyst's review of submission was received by MAF in August 2004.

The risk analysis and review of submissions will now be used to develop an import health standard.

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1. Summary

This document reviews new literature on diseases of *Seriola* sp. in New Zealand and worldwide that has been published since completion of the original import risk assessment (IRA). Then, taking this new information into account where necessary, the document addresses the issues raised in the nine submissions received in response to the original IRA for importation of cultured juvenile kingfish (*Seriola lalandi*) from hatcheries in South Australia for ongrowing at an aquaculture facility near Nelson, New Zealand. The submissions are included in full in Appendix 1.

The analyst addresses the issues raised by the submissions by discussing and clarifying the IRA process, providing additional information where required to clarify the recommended risk mitigation procedures, and where necessary proposes additional safeguards to mitigate risks (Section 5) to be incorporated into an Import Health Standard for cultured juvenile kingfish. The 13 recommended safeguards to be used for transport of juvenile kingfish 1-5 grams in weight from hatcheries in South Australia into New Zealand are listed in Section 6.

2. Introduction

This document has been produced for Island Aquafarms Ltd. Nelson, for the consideration of MAF Biosecurity Authority, to address the submissions responding to an assessment of the disease risks associated with a proposed importation of cultured juvenile kingfish (*Seriola lalandi*) from South Australia, for ongrowing at an aquaculture facility near Nelson, New Zealand (Diggles 2002, herein referred to as the IRA). Given that over 17 months have passed since the IRA was published on 4 February 2003, this review of submissions document will also review the new literature on diseases of *Seriola* sp. in New Zealand and worldwide that has been published since the compilation of the original document. This updated information will be considered in the responses to the submissions where relevant.

Since the publication of the IRA, Island Aquafarms Ltd. has negotiated arrangements to obtain kingfish fingerlings from various suppliers in South Australia. Furthermore, the quarantine facility intended for use in New Zealand has changed from NIWA Mahanga Bay, Wellington, to a MAF approved quarantine facility in New Zealand. These changes do not significantly affect any of the outcomes or recommendations of the original IRA, but they will nevertheless be noted in Section 3 and wherever else necessary.

Changes to the lists of disease agents known from wild and cultured kingfish based on findings of the latest literature review process are denoted in this document by including the new data into the disease agent lists (Section 3) in bold font. The changes to the sources of fingerlings, the location of the quarantine facility, and other minor changes to operational procedures are also denoted in the commodity description by their inclusion in bold font.

Nine submissions were received from interested parties (Section 8, Appendix 1). Summaries of these submissions are included in Section 4, followed by the analyst's response to each point raised. Additional risk mitigation procedures originating from the consultation process are included in Section 5. Section 6 contains the complete list of 13 risk mitigation recommendations for consideration by MAF Biosecurity if an Import Health Standard for the proposed imports is granted.

3. Literature Review

3.1 Commodity Description

Species	Yellowtail kingfish (*Seriola lalandi*)
Commodity	Live hatchery reared juveniles, **1 to 5 grams liveweight**
Origin	**Marine Hatcheries, South Australia**
Volume	1 to 3 batches per year, up to 15,000 fish per batch
Use	Ongrowing in culture for human consumption
Processing	Kingfish would be reared from eggs obtained from broodstock caught and domesticated locally in South Australia. Larvae and juveniles would be reared in a hatchery in seawater that is filtered to 1 µm and then UV sterilised. Batches of juveniles destined for export would be separated from other fish after weaning and held in a nursery tank in isolation (in separate tanks in a location physically and spatially separated from other batches) and reared until they reached **1 - 5 grams**. Batches that experience a mortality rate of **above 5% after transfer from the hatchery to the nursery tank** would not be accepted for export. Subsamples of fish from each acceptable batch would be tested by the Australian Animal Health Laboratory (AAHL) and/or other agreed competent authorities **in consultation with MAF National Centre for Disease Investigation (NCDI)**. Documentation of the daily mortality rate of each batch from egg hatching would be submitted at the same time as the subsampled fish so the disease history of each batch could be better assessed. Batches declared clinically healthy and free of the diseases listed in the Import Health Standard for Kingfish would be approved for export and issued an International Aquatic Animal Health Certificate.
Processing Premises	Batches of kingfish destined for export would be reared in the hatchery facilities of **various marine kingfish hatcheries** in South Australia. Testing of kingfish subsampled for disease from each batch would be carried out at the AAHL premises in Geelong, Victoria, or at the premises of an approved competent authority in South Australia as designated by Primary Industries and Resources, South Australia (PIRSA). After health certification in Australia, the remaining kingfish in each batch would be placed in a sealed container (MAF/AQIS approved seal) and air freighted to **New Zealand**. There would be no water exchange during transport. After clearing **New Zealand** customs the kingfish would be transported by road directly to **an approved transitional facility** for 4 weeks quarantine. Upon reaching the quarantine facility the seal to the transport container would be broken only by authorised MAF Quarantine officers. All wastewater discharged from the quarantine facility would **enter either the municipal sewage system, or alternatively, a holding tank to be treated with chlorine and neutralised before discharging (in line with MAF Standard 154.02.06)**. MAF NCDI would be immediately informed if a disease outbreak **characterised by an acute unexplained increase in mortality rate** was detected within 4 weeks of the fish being imported into New Zealand. Once cleared from quarantine the fish would then be shipped to the culture facility for ongrowing in landbased tanks or seacages for human consumption. **Any unusual mortalities which occur during ongrowing of fish obtained from Australia should be investigated by NCDI using parasitological, microbiological and virological methods and a diagnosis obtained.**
Controlling Authorities	Australian Quarantine and Inspection Service (AQIS), CSIRO Australian Animal Health Laboratory, Primary Industries and Resources, South Australia (PIRSA), MAF Biosecurity, **MAF NCDI**.

3.2 Diseases recorded from kingfish in Australia

The known diseases currently recorded from kingfish from Australian waters as of June 2004 (with the number of fish examined in each study when these data are available) include:

Viruses

Iridoviridae
Lymphocystis - body and fins, wild kingfish, Tuggerah, NSW (Reddacliff and Quartararo 1992, n = 2 fish).

Bacteria

Vibrio spp. - cultured kingfish, Spencer Gulf (A. Tindale, Hatchery Manager, Spencer Gulf Aquaculture personal communication. n = 1 fish).

Metazoa

Myxozoa

Unicapsula seriolae - muscle, wild kingfish, Moreton Bay, Queensland (Lester 1982, n = 26 fish).
Kudoa sp. - muscle, wild kingfish, Heron Island, Great Barrier Reef (Rohde 1976).

Copepoda

Brachiella sp. - gills, wild kingfish, Heron Island, Great Barrier Reef (Rohde 1977).
Caligus spinosus - gills, wild kingfish, Heron Island, Great Barrier Reef (Rohde 1977).

Monogenea

Monopisthocotylea
Benedenia seriolae - body surface, wild kingfish, Coffs Harbour, NSW, captive kingfish, Sydney, NSW (Whittington 1996), cultured kingfish, Spencer Gulf (Ernst *et al.* 2002).

Polyopisthocotylea
Paramicrocotyloides reticularis - gills, wild kingfish, Heron Island, Great Barrier Reef (Rohde 1978, n = 15 fish).
Zeuxapta seriolae - gills, wild kingfish, Heron Island, Great Barrier Reef (Rohde 1978, n = 15 fish), cultured kingfish, Spencer Gulf (Critchley 2000, Ernst *et al.* 2002).

Unknown aetiology

Neurological disorder - 70 day old cultured kingfish, Spencer Gulf (Weaver 2001).

3.3 Diseases recorded from kingfish in New Zealand

Various new studies have continued to examine kingfish in New Zealand primarily for the purposes of identifying disease agents (Sharp 2001, Sharp *et al.* 2003, 2004, Tubbs 2002, Diggles 2004a,b,c). The total number of kingfish examined specifically for disease agents now exceeds 400, including data gathered from populations of over 50,000 cultured fish. In addition to juvenile and adult fish, at least 6 discrete batches of kingfish eggs have been tested for viruses by NCDI with negative results. The known diseases currently recorded from kingfish from New Zealand waters as of June 2004 (with the number of fish examined in each study when these data are available, and new records in bold) include:

Bacteria

Vibrio spp. - cultured kingfish, Hauraki Gulf (B. Diggles, unpublished data). n = > 100 fish).

Metazoa

Copepoda

Caligus aesopus - skin (Jones 1988), gills (Sharp 2001). 74% prevalence (n = 39, Sharp 2001)
Caligus lalandei - skin (Jones 1988). 42% prevalence (n = 41, Sharp 2001)
Lernanthropus sp. - gills (Sharp 2001). Prevalence = 26 % (n = 46, Sharp 2001).
Neobrachiella sp. - gills (Sharp 2001). Prevalence = 24 % (n = 46, Sharp 2001).

Monogenea

Monopisthocotylea
Benedenia seriolae - body surface (Hine *et al.* 2000). 88% prevalence (n = 42, Sharp 2001).

Polyopisthocotylea
Zeuxapta seriolae - gills (Hine *et al.* 2000). 100% prevalence (n = 46, Sharp 2001)
***Paramicrocotyloides reticularis* - gills. 32% prevalence (n = 179, Diggles 2004c).**

Nematoda

Anisakis spp. larvae - encysted on mesenteries , body cavity (Hewitt and Hine 1972).
Hysterothylacium aduncum - intestine (Hewitt and Hine 1972).
Hysterothylacium seriolae - stomach (Hewitt and Hine 1972).
Hysterothylacium sp. larvae - stomach, intestine, body cavity (Hewitt and Hine 1972).

Acanthocephala

***Longicollum* ? sp. – intestine. Prevalence 49% (n = 67, Diggles 2004b).**

Nutritional

Nutritional cataract - cultured kingfish (Diggles 2004a, n = 10 fish)

3.4 Significant diseases of cultured *Seriola* spp.

Yellowtail (*Seriola quinqueradiata*) have been cultured on a commercial basis in Japan for over 50 years (Egusa 1983). During this time much information has been accumulated on the diseases of *S. quinqueradiata*, kingfish (*S. lalandi aureovittata*) and amberjack (*S. dumerili*) in that country. Viral, bacterial, fungal, protozoan and metazoan agents have all caused disease and have negatively affected production of *Seriola* spp. in Japan at some time or another (Egusa 1983, Kusuda and Salati 1993, Muroga 2001). The recent move towards aquaculture of *S. dumerili* in the Mediterranean has also resulted in increased knowledge of their disease agents in that region (Crespo *et al.* 1994, Grau *et al.* 1999, Montero *et al.* 2003a, b, c, 2004). Below is a list of the most prominent parasites and diseases of cultured *Seriola* spp. The list is not exhaustive, but instead has been compiled to indicate the range of significant diseases affecting cultured *Seriola* spp. around the world.

Viruses

DNA Viruses
Iridoviridae
Lymphocystis - *S. quinqueradiata* Japan (Egusa 1983).
Red sea bream iridovirus - *S. quinqueradiata* Japan (Matsuoka *et al.* 1996, Nakajima *et al.* 1998), *S. lalandi aureovittata* Japan (Matsuoka *et al.* 1996), *S. dumerili* Japan (Matsuoka *et al.* 1996, Kawakami and Nakajima 2002).

RNA viruses
Birnaviridae
Yellowtail ascites virus (YAV) - *S. quinqueradiata* Japan (Sorimachi and Hara 1985), *S. lalandi aureovittata/S. dumerili* hybrid Japan (Isshiki and Kusuda 1987).
Viral deformity (VD) - *S. quinqueradiata* Japan (Nakajima *et al.* 1993).

Bacteria

Epitheliocystis - *S. dumerili* Mediterranean (Crespo *et al.* 1990).
Lactococcus garvieae (syn. *Enterococcus seriolicida*) - *S. quinqueradiata* Japan (Egusa 1983, Kusuda and Salati 1993).
Nocardia kampachi - *S. quinqueradiata* Japan (Egusa 1983, Kusuda and Salati 1993).
Photobacterium damsela subsp. *piscicida* - *S. quinqueradiata* Japan (Kusuda and Salati 1993, Kawakami *et al.* 2000).
Streptococcus iniae - *S. quinqueradiata* Japan (Sako 1998).
Vibriosis (*V. anguillarum, V. harveyi*) - *S. quinqueradiata* Japan (Egusa 1983, Kusuda and Salati 1993), *S. dumerili* China (Wu and Pan 1997), **Mediterranean (Alcaide 2003),** *S. lalandi lalandi* New Zealand (B. Diggles, unpublished data).

Fungi

Ichthyophonus hoferi - *S. quinqueradiata* Japan (Egusa 1983).

Protozoa

Ciliophora

Cryptocaryon irritans - *S. dumerili* Mediterranean (Rigos *et al.* 2001).

Microsporidia

Kabataia seriolae (Beko disease) - *S. quinqueradiata* Japan (Sano *et al.* 1998, Lom *et al.* 1999).

Metazoa

Copepoda

Caligus spinosus - *S. quinqueradiata* Japan (Egusa 1983).
Caligus curtus - *S. dumerili* Mediterranean (Grau *et al.* 1999).

Myxozoa

***Ceratomyxa seriolae, C. buri* - *S. quinqueradiata*, Japan (Yokoyama and Fukuda 2001).**
Kudoa amamiensis - *S. quinqueradiata* Okinawa, Japan (Yokoyama *et al.* 2000).
Kudoa pericardialis - *S. quinqueradiata* Japan (Egusa 1983).
Myxobolus buri - *S. quinqueradiata* Japan (brain, Egusa 1985).
Myxobolus spirosulcatus - *S. quinqueradiata* Japan (bile duct, Maeno *et al.* 1995).
Myxobolus sp. - *S. dumerili* Mediterranean (Grau *et al.* 1999).

Monogenea

Monopisthocotylea
Benedenia seriolae – S. quinqueradiata Japan (Egusa 1983), *S. dumerili* Japan (Whittington *et al.* 2001), *S. lalandi aureovittata* Japan, *S. lalandi lalandi* Australia (Ernst *et al.* 2002), New Zealand (Hine *et al.* 2000, Sharp 2001).
Neobenedenia girellae – S. dumerili Japan (Ogawa *et al.* 1995).
Neobenedenia melleni – S. dumerili China (Li and Yang 2002).

Polyopisthocotylea
Heteraxine heterocerca – S. quinqueradiata Japan (Egusa 1983), *S. dumerili* Mediterranean (Grau *et al.* 1999).
Zeuxapta seriolae – S. lalandi lalandi Australia (Critchley 2000, Ernst *et al.* 2002), New Zealand (Diggles *et al.* 2002), ***S. dumerili* Mediterranean (Montero *et al.* 2004).**
***Allencotyla mcintoshi* - *S. dumerili* Mediterranean (Montero *et al.* 2003a, b).**

Digenea

Sanguinicolidae
Paradeontacylix grandispinus - *S. dumerili* Japan (Ogawa and Fukudome 1994).
Paradeontacylix kampachi - *S. dumerili* Japan (Ogawa and Fukudome 1994).
***Paradeontacylix kampachi* - *S. dumerili* Mediterranean (Montero *et al.* 1999, 2003c).**

Nematoda

Philometra globiceps - *S. dumerili* Mediterranean (Grau *et al.* 1999).
***Philometra lateolabracis* - *S. dumerili* Mediterranean (Moravec *et al.* 2003)**
Philometrioides seriolae - *S. quinqueradiata* Japan (Moravec *et al.* 1998).

Nutritional

Nutritional cataract - cultured kingfish, New Zealand (Diggles 2004a, n = 10 fish)

Unknown aetiology

Neurological disorder - 70 day old cultured kingfish, Spencer Gulf, Australia (Weaver 2001).

4. Replies to Submissions

4.1 Mr Paul Batten, Secretary of the Northern Amateur Fishers Association and President of Mangawhai Boating and Fishing Club

Mr Batten highlighted the importance of kingfish to recreational fishers, sport fishers, game fishers and customary gatherers in New Zealand. He suggests that these interest groups would not tolerate any risk whatsoever to the wild fishery due to the introduction of juvenile kingfish from Australia. He also opposed the culture of local kingfish stocks in sea cages and asked why the applicant company is asking for permission to import Australian kingfish when juvenile kingfish from New Zealand broodstock are commercially available in New Zealand.

Analysts response

New Zealand, as a member of the World Trade Organisation (WTO), is obliged under the Agreement on the Application of Sanitary and Phytosanitary Measures (the so called "SPS Agreement", WTO 1995) to employ measures to protect the health of kingfish and other species of fish and shellfish in the New Zealand environment, provided that these measures are not applied arbitrarily or constitute a disguised restriction of trade. However the position taken by Mr Batten, which promotes blanket rejection of importation of juvenile kingfish based on acceptance of only zero risk, contravenes the SPS Agreement because the zero risk position was arrived at arbitrarily. Mr Batten did not outline any technical shortcomings of the IRA nor did he point out any additional diseases that may be present in cultured kingfish from South Australia which should have been considered in the IRA. This suggests that the zero risk position endorsed by Mr Batten is not a defensible position under current WTO rules.

The applicant company is currently ongrowing kingfish produced by New Zealand hatcheries but has chosen to pursue the option of importation of kingfish fingerlings from Australia for commercial reasons. These reasons relate to factors such as ensuring continuity of supply, allowing access to fingerlings at a suitable time of the year for ongrowing, and allowing the industry choice for sourcing high quality certified disease-free fingerlings from alternative suppliers (see also Section 4.6.2).

4.2 Department of Conservation

Representatives of the Department of Conservation (DoC) highlighted a number of areas where they sought clarification, namely

1. The myxozoan parasite *Kudoa thyrsites* can still infect Atlantic salmon in water supplies filtered to 1µm. DoC asked what the level of confidence was that the proposed water treatments (filtered to 1µm and UV irradiated) will ensure that no unwanted organisms will be entering with the imports.
2. What level of confidence is there that the 5% batch mortality rate suggested (above which a batch of fish will be rejected) will prevent the importation of large numbers of asymptomatic fish.

3. What is the level of confidence that a given disease will be detected in a sample of 150 fish out of a population of 15,000 fish.
4. What level of confidence is there that the 4 week quarantine period suggested will be sufficient to ensure that all potential diseases have expressed themselves, whether followup testing procedures are in place should fish exhibit disease at a later stage, and whether the importers are required to notify MAF of any disease outbreaks in the imported fish.
5. Clarification of the food source used while in quarantine and, if exported from Australia, what measures are in place to ensure that imported food does not contain contaminants and unwanted organisms.
6. Whether the potential marine pathogens considered in the risk assessment would affect New Zealand indigenous freshwater and estuarine fish, and amphibians.

Analysts response

4.2.1 The infective stage of *K. thyrsites* has not been characterised, however it is known that UV irradiation at levels above 35 mWs/cm^2 inactivates the waterborne infective stages of another myxosporean parasite *Myxobolus cerebralis* (see Hoffman 1975, Hedrick *et al.* 2000). It would be reasonable to expect, therefore, that the infective stages of *K. thyrsites* are susceptible to UV irradiation at some level. Levels of UV irradiation around 35 mWs/cm^2 are easily achievable in hatcheries using commercially available UV irradiation equipment (Torgersen and Hastein 1995). It may be prudent, therefore, to maximise the level of confidence that *K. thyrsites* infective stages would be inactivated by UV irradiation treatment by specifying the water supply used to maintain juvenile kingfish destined for export to New Zealand must be exposed to a minimum level of 35 mWs/cm^2 UV irradiation.

4.2.2 The cutoff at 5% mortality level was chosen because this is an extremely conservative cutoff figure for hatchery rearing of kingfish. It is not unusual to have mortality rates above 30% in batches of kingfish in the absence of transmissible disease, due to mortality from husbandry related factors such as poor egg quality, sub optimal water quality (inadequate aeration, inappropriate light levels), feeding problems (failure to feed), weaning from live food onto artificial food (failure to wean) and so on. If a batch of kingfish experiences less than 5% mortality following transfer from the hatchery to the nursery (up until the date of sampling of juveniles for disease) they can be considered extremely hardy and the likelihood of fish from such a batch being asymptomatic carriers of disease would be extremely remote.

4.2.3 A sample of 150 fish taken from a population of over 1 million fish would provide 95% confidence of detecting a disease agent at 2% prevalence, assuming the diagnostic tests used were 100% sensitive for detecting the disease agents being tested for. In reality few diagnostic tests currently available approach 100% sensitivity and hence the disease prevalence a 150 fish sample can test for at the 95% confidence level is somewhat more than 2%. However the 150 fish sample size is an internationally accepted and statistically defensible standard used around the world for fish disease certification. It was chosen because the confidence and sensitivity levels achievable from a 150 fish sample approximate best practice methodology using the diagnostic tests (virus culture on cell lines) proposed.

4.2.4 The 4 week quarantine period proposed is one week more than specified in the MAF Import Health Standard for the importation into New Zealand of ornamental fish and marine invertebrates from all countries (http://www.maf.govt.nz/biosecurity/imports/animals/standards /fisornic.all.htm). It is also one week more than recommended by AQIS for quarantine of marine species imported into Australia (AQIS 1999a). The juvenile kingfish would be stressed by the confinement and handling during transport and quarantine and there would be a very high level of confidence that any underlying disease states would be expressed in the 4 week quarantine period immediately after transport. It is considered highly unlikely that a shipment of kingfish from Australia would have 100% survival during transport and the subsequent 4 weeks quarantine. Examination of diseased or dead fish encountered during transport and quarantine for disease agents by the NCDI (as required under the proposed Import Health Standard) is one of the proposed risk mitigation procedures. These compulsory examinations would have a high chance of detecting disease agents if they were present in moribund fish. It would be reasonable to expect that if no mortalities were encountered during transport and quarantine, the imported kingfish could be considered extremely hardy. In either situation the level of confidence that the kingfish were not carriers of subclinical disease would be extremely high.

4.2.5 The food source used during quarantine would be a commercially available pelleted feed formulated for kingfish. This feed is manufactured in Tasmania by Skretting Ltd. and is already being used in New Zealand to feed cultured kingfish in both the North and South Islands. This feed complys with the MAF Draft Import Health Standard for the importation into New Zealand of fish food, fish bait, *Artemia salina*, *Artemia fransiscana* from all countries (http://www.maf.govt.nz/biosecurity/imports/animals/standards/drafts/fisfooid.all.pdf).

4.2.6 Freshwater and marine fish, shellfish and crustaceans in the New Zealand environment were all considered during the IRA process. All of the 9 disease groups considered in the detailed section of the IRA have been recorded in estuarine or freshwater fish species at some time, hence at all times in the IRA potential impacts on estuarine or freshwater fish and shellfish were considered. The example cited by DoC in the AQIS Import Risk Analysis on live ornamental finfish pertained specifically to viruses of the family Iridoviridae that can infect both fish and ectothermic terrestrial vertebrates with an aquatic stage in their life cycle (such as amphibians and some reptiles) (AQIS 1999a, Walker 2001). In Japan, kingfish have been demonstrated to be susceptible to red sea bream iridovirus (RSBIV) (Matsuoka *et al.* 1996, Kawakami and Nakajima 2002). The IRA outlined in section 5.3 that while iridoviruses (e.g. Epizootic Haematopoietic Necrosis virus (EHN)) have been recorded in the freshwater environment in Australia (Langdon *et al.* 1986, 1988, Whittington *et al.* 1996), the location of the hatcheries in South Australia in or adjacent to the hypersaline inverse estuaries of the Spencer Gulf suggests the chances of juvenile kingfish being exposed to freshwater iridoviruses would be negligible. Furthermore, obligate marine fish species appear refractory to infection by EHN (Nakajima and Maeno 1998). However, the possibility of emergence of a new marine iridovirus remains and the IRA could not completely rule out the possibility that juvenile kingfish from South Australia could pose a risk of introduction of a novel iridovirus. Therefore the

proposed risk mitigation measures outlined in the IRA included testing each batch of fish for the presence of novel iridoviruses using cell culture.

It is possible that reptiles and amphibians in estuarine areas of New Zealand could be susceptible to a novel iridovirus originating from kingfish. However kingfish are an obligate marine species, and the likelihood of reptiles and amphibians coming in contact with kingfish infected by a novel iridovirus would appear negligible. This is because a batch of cultured juvenile kingfish from South Australia destined for New Zealand would firstly have to become infected with a novel iridovirus, but not become diseased so that mortalities exceeded 5%. The virus would need to remain undetected during routine screening by cell culture, the fish would need to remain subclinically affected during the stresses of transport and quarantine, then infected kingfish would have to escape from seacages, swim into estuarine or freshwater areas and present an infectious dose of iridovirus to native amphibians. Disease caused by iridovirus is usually expressed in juvenile fish after exposure to stressors (Langdon 1989, Georgiadis *et al.* 2001), and it would appear extremely unlikely that juvenile kingfish infected with a novel iridovirus of any significance would endure the stresses of transport and quarantine without expressing disease. Nevertheless, the IRA suggested adoption of a precautionary approach towards managing any potential risks by screening each batch of kingfish for viruses, including iridovirus, using methods of cell culture recommended by the OIE.

4.3 Mr Jim Mikoz, Honorary Vice President New Zealand Angling and Casting Association, Secretary Wellington Recreational Marine Fishers Association and Wellington Surfcasting and Angling Club

Mr Mikoz asked a number of questions on issues related to the genetics of Australian kingfish and whether the proposed introductions posed a genetic threat to local kingfish stocks.

Analysts response

Section 1.1 of the IRA detailed the current knowledge of the stock structure of Australian and New Zealand kingfish. The IRA showed that, due to natural movements of adult kingfish between Australia and New Zealand (Smith *et al.* 1991, Saul and Holdsworth 1992, Gillanders *et al.* 1997, Holdsworth and Saul 1998, Gillanders *et al.* 2001), there is negligible genetic risk to New Zealand kingfish associated with the proposed importation of the commodity. Natural gene flow between the two countries occurs to such an extent that there is no significant divergence in microsatellite or mitochondrial DNA sequences between kingfish sampled from Australia and New Zealand (Nugroho *et al.* 2001). The genetic techniques used in that study were state of the art and identical to the methods used to delimit 3 discrete stocks snapper in New Zealand waters (Bernal-Ramirez *et al.* 2003). Despite the fact that trans-Tasman migrations of tagged adult kingfish have been documented on only a few occasions, the lack of significant genetic differentiation between kingfish sampled from Australia and New Zealand strongly suggests that natural trans-Tasman movements of kingfish result in more significant gene flow than do movements of snapper around New Zealand.

4.4 Mr Bert Lee, Tolaga Bay East Cape Charters

Mr Lee asked why the applicant company is asking for permission to import Australian kingfish when juvenile kingfish from New Zealand broodstock are commercially available from New Zealand hatcheries. He also pointed out that there is no evidence that juvenile kingfish cross the Tasman Sea and that only very few tagged adult kingfish have made trans-Tasman migrations. Mr Lee suggests that New Zealand kingfish apparently grow to a larger average size than in Australia and that may point to differences between the two stocks that could be lost by mixing with escaped Australian sourced stock. He suggests that escapes from seacages would be inevitable and that any risk of disease or parasite introduction, even small, is unacceptable to the New Zealand commercial and recreational fishing industries.

Analysts response

The applicant company is currently ongrowing kingfish produced by New Zealand hatcheries but has chosen to pursue importation of kingfish fingerlings from Australia for commercial reasons in the interest of continuity of supply, availability of fingerlings at the most appropriate time of year, and allowing a choice of sourcing high quality certified disease-free fingerlings from alternative suppliers (see also Section 4.6.2).

The IRA also highlighted (final two paragraphs of IRA, Section 1.1) that while there have been no documented trans-Tasman movements of juvenile kingfish, modelling suggests that passive trans-Tasman movements of rock lobster phyllosoma larvae along the Tasman Front are possible (Chiswell *et al.* 2003). This also suggests that larval and juvenile kingfish associated with floatsam could also theoretically make trans-Tasman movements, although none have been recorded at this time because tagging of juvenile kingfish less than 6 months old has not been done. The IRA then highlighted (IRA, Section 1.2) that the trans-Tasman movement of juvenile or adult kingfish, while significant at a genetic level, is probably irrelevant when considering diseases of hatchery reared juvenile kingfish. This is because juveniles reared in hatcheries are exposed to coastal waters that may carry disease agents (including viruses, bacteria and protozoa) which would not normally be encountered by naturally spawned kingfish in the epipelagic oceanic environment.

The lack of evidence of significant genetic differences between kingfish stocks in Australia and New Zealand (Nugroho *et al.* 2001), together with the fact that the maximum sizes recorded for kingfish in both countries are similar at around 2.5 m long (Gommon *et al.* 1994, Paul 2000), suggests that if the average size of kingfish caught by recreational fishers in New Zealand is larger than in Australia (as reported by Mr Lee), this is probably due to factors other than genetics. Kingfish are under heavy fishing pressure on the east coast of Australia with the NSW fishery considered to be growth overfished and fully exploited (Stewart *et al.* 2001). This situation appears due to the large human population base and well established commercial fishery for kingfish which (until recently) was mostly based on highly efficient pelagic kingfish traps (Stewart *et al.* 2001). The size at first maturity of kingfish in NSW waters is slightly less than in New Zealand waters (Poortenaar *et al.* 2001), which could be due to selection for early maturation by fishing pressure (Rochet *et al.* 2000) or perhaps also due to warmer water resulting in faster growth and earlier maturity (Poortenaar *et al.* 2001). Therefore in view of the genetic information currently available, a logical explanation for a larger average size of kingfish caught by recreational fishers in New Zealand is that this is more likely due to reduced fishing pressure and/or other environmental conditions, such as

differences in water temperature or more abundant food supplies in New Zealand, than any genetically determined trait.

The position taken by Mr Lee promoting rejection of importation of juvenile kingfish based on acceptance of only zero risk contravenes the SPS Agreement, because the zero risk position was arrived at arbitrarily. No technical shortcomings of the IRA were pointed out nor were any additional diseases highlighted which may be present in cultured kingfish from South Australia but not considered in the IRA. This suggests that the zero risk position endorsed by Mr Lee is not a defensible position under current WTO rules.

4.5 New Zealand Big Game Fishing Council

The New Zealand Big Game Fishing Council (NZBGFC) noted the uncertainty associated with the disease status of kingfish at this time. They noted that a slight or undetermined risk of introduction of disease via imported kingfish is of grave concern to their 32,000 financial members. The NZBGFC also contended that New Zealand kingfish apparently grow to a larger average size than in Australia and that may be due to genetic differences, environmental factors or both. The NZBGFC suggest that just because studies of microsatellite and mitochondrial DNA (did not) find significant genetic divergence between New Zealand and Australian fish, that did not mean that the stocks are genetically identical. The NZBGFC also pointed out that many hundreds of adult kingfish over 100 cm have been tagged in New Zealand in recent years and that none of these had been recaptured in Australia. The NZBGFC noted the availability of New Zealand bred kingfish fingerlings and suggested it would be better for all concerned to use this locally bred stock.

Analysts response

Both of the issues raised by the NZBGFC have already been addressed in section 4.4 above.

4.6 New Zealand King Salmon Ltd.

The New Zealand King Salmon Company (TNZKSC) objected to the importation of live juvenile kingfish from Australia to New Zealand and recommended that transfers not be permitted until such time as the potential hazards or risks associated with these hazards were adequately addressed. TNZKSC objected on the grounds that they considered:

1. There had been an inadequate Import Risk Assessment process. It did not cover all of the potential hazards and the risks associated with these and was therefore subject to error.
2. The benefits of allowing the proposed imports had not been outlined in comparison to the risks.
3. The disease profile of the kingfish population in Australia and New Zealand was poorly characterised. There should be a study of the diseases and practical investigation of diseases of kingfish in NZ and Australia to establish if any are likely to flare up once commercial, intensive cage aquaculture commences; and

4. The risks to the wild kingfish population, other native NZ wild fish and to existing commercial finfish farming operations needed to be considered. They contended these had not been adequately addressed in the Import Risk Assessment.

TNZKSC then outlined an additional 13 issues, each expanding on the 4 main points listed above.

Analysts response

4.6.1 To deal with the limited knowledge currently available on diseases of kingfish in Australia and New Zealand, the IRA reviewed in detail not only the known diseases of kingfish in Australia and New Zealand, but also a number of other diseases of Australian fish and of *Seriola* sp. cultured in the northern hemisphere (IRA, section 3). The risks of disease translocation even in the absence of disease identification in the exporting country (Gaughan 2002) were noted (IRA, Section 3.4), and a pragmatic approach was taken so that all transmissible diseases known from *Seriola* sp. worldwide to date, based on over 50 years of data, were included in the IRA together with all those fish diseases listed in New Zealand and internationally as notifiable and/or significant (IRA, Section 4). In this manner the IRA followed a very inclusive and precautionary approach towards dealing with uncertainty. Furthermore, the IRA emphasised that any risk reduction methods recommended in an import health standard for kingfish imports from Australia should be reviewed immediately whenever significant additional information on the disease status of kingfish (or other relevant marine species) in Australian and New Zealand waters becomes available (IRA, Section 3.4.1). In doing so the IRA presented a very comprehensive approach towards identifying possible disease risks posed by the importation of the proposed commodity. Drafts of the assessment were critically analysed by two internationally recognised aquatic animal health experts in both New Zealand and Australia, and they considered the document technically sound.

4.6.2 The benefits of the proposed importations are commercial in nature. They relate to development of a commercially viable kingfish aquaculture industry by ensuring fingerling supplies are available at the correct time of year to maximise the summer growing season. At present in New Zealand, kingfish fingerlings are commercially available, but only at one time of the year (late summer). Juveniles from late summer spawnings do not grow to sufficient size to allow them to over-winter in the cooler waters of New Zealand south of Auckland without significant mortalities. Hence supply of fingerlings generated in early spring, as is available from South Australian hatcheries, is a prerequisite for the economic viability of kingfish farming in the waters of New Zealand south of Auckland. A commercial kingfish culture industry has the potential to offer significant social and economic benefits to New Zealanders living in regional areas, and to the New Zealand economy.

4.6.3 The disease profile of kingfish in Australia and New Zealand was reviewed in the IRA in light of the knowledge available at that time. In the ensuing 16 months since the IRA was published additional information has been published on the disease status of wild and cultured kingfish in both countries, and overseas (see section 3 of this document). None of this additional information has identified any

new diseases not already considered in the IRA, nor has it suggested any significant differences in the disease status of kingfish between the two countries. In fact, as the number of kingfish examined for disease agents in New Zealand has increased, it has become apparent that their disease profile is more similar to Australian kingfish than was previously recognised. For example, the monogenean *Paramicrocotyloides reticularis* was described by Rohde (1978) from kingfish on the Great Barrier Reef, but was only recently observed in New Zealand kingfish (Diggles 2004b,c).

4.6.4 See replies to 4.6.1 above and to 4.7.5 and 4.7.6 below.

Reply to the additional 13 points raised by TNZKSC

All of the 13 additional points raised by TNZKSC in their submission have either 1. Been addressed in other sections of this document (e.g. TNZKS issues points 1, 3, 4, 5, and 6, addressed here in sections 4.3, 4.2.4, 4.2.2, 4.2.3 and 4.3, respectively), or 2. Assume that the IRA was inadequate and that unknown, unspecified disease risks remain associated with movements of kingfish between Australia and New Zealand. The inability of TNZKSC to identify specific disease risks to New Zealand fish and shellfish that were not covered by the IRA suggests they have chosen to take a position that highlights the uncertainty inherent in all IRAs, (and particularly those dealing with marine fish) in that the future cannot be predicted. However due to the inclusive nature of the IRA towards risk identification, together with absence of evidence of serious technical deficiencies in the IRA (through its approval for release by two international experts), the position taken by TNZKSC appears to be an arbitrary one.

TNZKSC appeared to suggest that regulations enacted to protect salmonids should be made the benchmark for all other fish species. However this approach would not represent best practice because, in most cases, the regulations pertaining to control of diseases of salmonids are largely irrelevant to obligate marine fish such as kingfish, which are not susceptible to the same diseases or parasites, and hence pose little if any risk to sea cage culture of salmonids. *Seriola* sp. have been cultured in Japan for over 50 years, and during that time there has not been one instance recorded where kingfish have acted as disease vectors or reservoirs of infection for salmonids. Furthermore, there were various technical deficiencies in some of the positions given by TNZKSC. For example, TNZKSC correctly pointed out that amoebic gill disease (AGD) is a major problem for the farmed salmon industry in Tasmania, but is not a commercially significant problem in New Zealand. However they failed to consider that the Atlantic salmon (*Salmo salar*) reared in Tasmania are known to be particularly susceptible to *Neoparamoeba pemaquidensis*, the causative agent of AGD, while epidemiological evidence from around the world suggests chinook salmon (*Oncorhynchus tshawytscha*) (as reared in New Zealand) is largely refractory to infection (Munday *et al.* 2001, Diggles *et al.* 2002). Because *N. pemaquidensis* already occurs in the New Zealand environment (Munday *et al.* 2001, Diggles *et al.* 2002, Wong *et al.* 2004) and AGD has never been recorded from cultured *Seriola* sp. worldwide, this disease agent was not relevant and therefore was not considered in the IRA.

Opposition to import proposals tend to focus on the aspects of uncertainty surrounding the proposal (Hine and MacDiarmid 1997). However in the absence of serious technical deficiencies in the IRA (through the review and approval of the IRA by two international experts in the field prior to its release), the non-specified “disease risks” suggested by NZKS

appear unsubstantiated and are not significant enough to support their position which advocates rejection of the proposal to import the commodity. The position endorsed by NZKS is not defensible under current WTO rules, as prevention of importation of the proposed commodity on the basis of unsubstantiated "risks" from non-specified diseases is contrary to the SPS agreement.

4.7 New Zealand Seafood Industry Council (SeaFIC)

The SeaFIC submission began with four dot points that outlined its representation and interests. Points 5 to 10 then proceeded to discuss the following:

4.7.5 and 4.7.6 SeaFIC was concerned that the IRA failed to adequately assess the potential consequences following a risk event occurring. SeaFIC considers the analysis should be expected to establish the possible economic and environment effects that could arise from the introduction, establishment or spread of an introduced disease, including the potential damage in terms of loss of production or sales in the event of the entry, establishment or spread of disease; and the costs of control or eradication in New Zealand. In the absence of this information SeaFIC considered it was impossible to assess whether the conditions proposed adequately reflect both the risks of introduction of disease, and the potential effects that may occur as a result.

4.7.7 SeaFIC also noted that what constitutes best practice to address biosecurity risks posed through transfer of live aquatic animals is continually being challenged. The uncertainty surrounding the ability to identify parasites and pathogens in aquatic animals underlies the most common concern raised by their industry, that of the potential for unknowingly introducing a disease that was either not tested for, or was not conspicuous prior to release from quarantine. SeaFIC considered the liklihood of releasing an unidentified disease or pathogen was not explicitly dealt with in the assessment. They questioned what steps were taken to minimise the risk of such an event occurring.

4.7.8 SeaFIC cited feedback from a workshop (Biosecurity in Aquaculture Production System: Exclusion of pathogens and other undesirables) by Webb (2001) that recommended New Zealand should consider adopting standards similar to those used in Canada which allowed only for importation of gametes into quarantine and captive rearing of the first generation. These standards were introduced from the understanding that pathogens were more likely to be introduced from fish than their eggs. A further recommendation from the workshop was for New Zealand to develop containment standards that aim to minimize the dissemination of pathogens to the outside environment.

4.7.9 SeaFIC considered that in the absence of New Zealand Standards they were keen to ensure that the conditions to minimize the risks of introducing disease outlined in the IRA represent our current understanding of best practice.

4.7.10 Until these issues are clarified, SEAFIC considered that it would be inappropriate to issue an import health standard based on the conditions set out in this risk assessment.

Analysts response

4.7.5, 4.7.6 The IRA included a section on consequence assessment for each of the 9 diseases considered in the risk assessment section (IRA, section 5). For simplicity the consequences of an event occurring were classified into one or two of 5 generic

categories (IRA, section 2.1). The 5 categories were termed (in order of decreasing consequence) catastrophic, high, moderate, low and negligible. The definitions used for each term followed those outlined by AQIS (1999a, 1999b). They were as follows:

Catastrophic:	Establishment of diseases which would be expected to significantly harm economic importance at a national level, and/or cause serious and irreversible harm to the environment.
High:	Establishment of diseases that would have serious biological consequences (e.g. high mortality or morbidity) and would not be amenable to control or eradication. Such diseases could significantly harm economic performance at an industry level and/or may cause serious harm to the environment.
Moderate:	Establishment of diseases which would have less pronounced biological consequences and may be amenable to control or eradication. Such diseases could harm economic performance at an industry level and/or may cause some environmental effects, which would not be serious or irreversible.
Low:	Establishment of diseases which would have mild biological consequences and would normally be amenable to control or eradication. Such diseases may harm economic performance at an industry level for a short period and/or may cause some minor environmental effects, which would not be serious or irreversible.
Negligible:	Establishment of diseases which would have no significant biological consequences and would require no control or eradication. Such diseases would not affect economic performance at an industry level and would cause negligible environmental effects.

The terms used throughout the IRA were thus necessarily general in nature, but could be used by the reader to gain an idea of the magnitude of the possible economic and environment effects that could arise from the introduction, establishment or spread of an introduced disease. Obviously it is very difficult and beyond the scope of a qualitative IRA to predict exact figures for loss of production or sales in the event of the entry, establishment or spread of disease; and the costs of control or eradication to New Zealand.

4.7.7 The uncertainty regarding the disease status of kingfish in both Australia and New Zealand was duly acknowledged in the IRA. To deal with the limited knowledge currently available on diseases of kingfish in Australia and New Zealand, the IRA reviewed in detail not only the known diseases of kingfish in Australia and New Zealand, but also a number of other diseases of Australian fish and of *Seriola* sp. cultured in the northern hemisphere (IRA, Section 3). The risks of disease translocation even in the absence of disease identification in the exporting country (Gaughan 2002) were noted (IRA, Section 3.4), and a pragmatic approach was taken so that all transmissible diseases known from *Seriola* sp. worldwide to date were included in the IRA together with all those fish diseases listed in New Zealand and

internationally as notifiable and/or significant (IRA, Section 4). In this manner the IRA followed a very inclusive and precautionary approach towards dealing with uncertainty. Furthermore, the IRA emphasised that any risk reduction methods recommended in an import health standard for kingfish imports from Australia should be reviewed immediately whenever significant additional information on the disease status of kingfish (or other relevant marine species) in Australian and New Zealand waters becomes available (IRA, Section 3.4.1). In doing so the IRA fulfilled all OIE requirements for risk assessment and specified a number of very conservative risk mitigation measures, including treatment of water supplies containing kingfish destined for export, use of only hatchery reared or artificial food, rejecting batches with greater than 5% mortality or any fish with ulcerative dermal lesions and/or ectoparasitic infections, implementation of a virus testing programme and rejection of batches of fish positive for virus, and importation into 4 weeks quarantine in New Zealand, to further mitigate any risks involved with the proposed importations. In view of the apparent absence from the Australian environment of many of the diseases assessed in the IRA at this time, and considering the current disease status of both countries with regard to obligate marine, non-salmonid fishes, the risk mitigation measures proposed provide New Zealand with a level of protection considerably higher than the world average. Prevention of importation of the proposed commodity on the basis of unsubstantiated "risks" from non-specified diseases, as advocated by SeaFIC, is contrary to the SPS agreement, and would not be defensible under current WTO rules.

4.7.8 and 4.7.9 Blanket adoption of risk mitigation methods used by other countries is not necessarily best practice without first assessing whether the methods promoted by other countries are the most appropriate for local situations and the species being proposed for introduction. For example, the suggested importation of gametes into quarantine and captive rearing of the first generation would be appropriate for movements of a new species previously exotic to the receiving country. Quarantine of the first generation would also be appropriate if live salmonids from the Northern Hemisphere were imported into New Zealand, due to the many exotic diseases recorded from wild and cultured salmonids in the northern hemisphere and the lack of natural movements of salmonids through the tropics between the northern and southern hemispheres. However, kingfish are native to New Zealand and some kingfish move naturally between New Zealand and Australia. Furthermore, many important diseases of fish are vertically transmitted through the egg or sexual fluids and therefore it would be erroneous to suggest that movement of gametes is a significantly lower risk activity in itself. Furthermore, when eggs are imported the opportunity to stress test fingerling fish during the transport process is lost. Most significant diseases of fish, particularly sub-clinical viral diseases of juvenile fish, can be promoted to the clinical disease state by stressing the fish. Therefore when these factors are considered for different species and different circumstances, a blanket gamete-only standard may not be best practice. In New Zealand MAF Biosecurity Authority have a policy of developing import health standards for specific import requests on a case-by-case basis. For each case an IRA is performed and after an industry and public consultation process a decision is made as to whether the importation should proceed based on the risks and benefits posed by the proposed importation to New Zealands flora, fauna, environment and economy. If so, an Import Health Standard is drawn up which outlines the appropriate risk mitigation procedures identified during the IRA process to minimise any associated risks to New

Zealands, flora, fauna and environment from the proposed import. This process has proven in the past to be effective due to its flexibility and the ability to tailor the import health standard for each individual case. Furthermore, there has also been an Import Health Standard for importation of ornamental fish (including marine fish) into New Zealand for many years, and hence SeaFICs contention that New Zealand has no existing standards covering the proposed importation is incorrect.

4.8 Dr Mark Feldman

Dr Feldman referred to the herpesvirus infections that affected pilchards in Australia and New Zealand in 1995 and in Australia again in 1998/99. He asked whether the pilchard herpesvirus was considered in the kingfish IRA as the disease appeared to originate from Australia.

Analysts response

The most likely cause of the massive mortalities of pilchards in Australian waters in 1995 and 1998/99 was infection by a virus of the family Herpesviridae (Griffin *et al.* 1997 Whittington *et al.* 1997, Hyatt *et al.* 1997, Fletcher *et al.* 1997, Gaughan 2002). The spread of the disease in both cases was indicative of an exotic pathogen to which Australian and New Zealand *Sardinops* had not been previously exposed (Fletcher *et al.* 1997, Gaughan 2002). The reasons why the epizootic spread to New Zealand in 1995 (Hine 1995), but not 1998/99 are not known, however shipments of frozen pilchards were exported from affected locations in Australia into New Zealand in 1995, but not in 1998/99 (M Hine, NCDI, personal communication), suggesting the virus can be spread by movements of freshly frozen fish.

Adult pilchards were the only species affected by the virus during both epizootics (Whittington *et al.* 1997, Gaughan 2002) and viral particles were visualised only in gill epithelial cells. The pilchard herpesvirus was therefore extremely host and organ specific, therefore it was not considered in the IRA, as kingfish are not a known host for the virus and hatchery reared kingfish are not fed pilchards. Furthermore, the pilchard herpesvirus was recorded from New Zealand waters in 1995 and hence is considered endemic to both Australia and New Zealand. However Dr Feldman may instead have been implying the possibility of cultured kingfish fingerlings harboring other, as yet unknown and unidentified disease agents, in a way that herpesvirus was previously unknown from pilchards prior to 1995. To deal with the limited knowledge currently available on diseases of kingfish in Australia and New Zealand, the IRA reviewed in detail not only the known diseases of kingfish in Australia and New Zealand, but also a number of other diseases of Australian fish and of *Seriola* sp. cultured in the northern hemisphere (IRA, Section 3). The risks of disease translocation even in the absence of disease identification in the exporting country (Gaughan 2002) were noted (IRA, Section 3.4), and a pragmatic approach was taken so that all transmissible diseases known from *Seriola* sp. worldwide to date were included in the IRA together with all those fish diseases listed in New Zealand and internationally as notifiable and/or significant (IRA, Section 4). In this manner the IRA followed a very inclusive and precautionary approach towards dealing with uncertainty. Furthermore, the IRA emphasised that any risk reduction methods recommended in an import health standard for kingfish imports from Australia should be reviewed immediately whenever significant additional information on the disease status of kingfish (or other relevant marine species) in Australian and New Zealand waters becomes available (IRA, Section 3.4.1). However at this time

prevention of importation of the proposed commodity on the basis of unsubstantiated "risks" from non-specified diseases is contrary to the SPS agreement and would not be defensible under current WTO rules.

4.9 MAF Indigenous Flora and Fauna group, Biosecurity co-ordination

The MAF Indigenous Flora and Fauna group sought clarification on a number of issues, namely:

1. Period of quarantine in New Zealand. Should be stated as a "minimum" of 4 weeks subject to all batches exhibiting no symptoms of exotic disease or unexplained mortality. The rationale behind selection of a 4 week quarantine period was requested.

2. The rationale behind the sample sizes selected per batch for testing for specific pathogens.

3. How one batch differed from another

4. The rationale behind why 5% mortality was chosen as the baseline indication of health problems and whether selection of such a cutoff indicated freedom from pathogens.

5. The MAF transitional standard to which the proposed quarantine facility was expected to be accredited.

6. What would be the acceptance level of kingfish with dermal lesions - was the intention inspection of 100% of fish with 0 found or by subsampling ?

Analysts response

4.9.1 The 4 week quarantine period proposed is one week more than specified in the MAF Import Health Standard for the importation into New Zealand of ornamental fish and marine invertebrates from all countries (http://www.maf.govt.nz/biosecurity/imports/animals/standards/fisornic.all.htm). It is also one week more than recommended by AQIS for quarantine of marine species imported into Australia (AQIS 1999a). As mentioned previously (point 4.2.4 above), there would be a very high level of confidence that any underlying disease states would be expressed during transport and/or in the 4 weeks quarantine period immediately after transport. The fact that kingfish showing unexplained mortalities or of uncertain disease status would not be allowed by MAF to leave the transitional facility even after 4 weeks quarantine is implicit in the wording of the Import Health Standard, however the revised wording proposed by the MAF Indigenous Flora and Fauna group is an explicit statement worth including to clarify this point.

4.9.2 A sample of 150 fish taken from a population of over 1 million fish would provide 95% confidence of detecting a disease agent at 2% prevalence, assuming the diagnostic tests used were 100% sensitive for detecting the disease agents being tested for. In reality few diagnostic tests currently available approach 100% sensitivity and hence the disease prevalence a 150 fish sample can test for at the 95% confidence level is somewhat more than 2%. However the 150 fish sample size is an internationally accepted and statistically defensible standard used around the world for fish disease

certification. It was chosen because the confidence and sensitivity levels achievable from a 150 fish sample approximate current best practice methodology using the diagnostic tests (virus culture on cell lines) proposed.

4.9.3 Kingfish are spawned from captive broodstock. The broodstock spawn spontaneously in large tanks without human intervention. They do not spawn continually, but at discrete times and therefore each spawning event provides a discrete batch of fertilised eggs which can be isolated from other batches prior to hatching by placed them into their own hatching tank. The eggs can then be hatched, larvae ongrown and metamorphosed into juveniles in complete isolation from other batches of eggs. Only those eggs from spawning events which provided sufficient numbers of eggs for the planned export consignment would be used. Hence each batch of fish consigned for export could be traced back to spawning events which occurred on one particular day and juveniles in excess of those required for export would simply not be packaged for transport.

4.9.4 The cutoff at 5% mortality level was chosen because this is an extremely conservative cutoff figure for hatchery rearing of kingfish. It is not unusual to have mortality rates above 30% in batches of kingfish in the absence of disease agents, due to mortality from husbandry related factors such as poor seed quality, sub optimal water quality (inadequate aeration, inappropriate light levels), feeding problems (failure to feed), weaning from live food onto artificial food (failure to wean) and so on. If a batch of kingfish experiences less than 5% mortality following transfer from the hatchery to the nursery (up until the date of sampling of juveniles for disease) they can be considered extremely hardy and the likelihood of fish from such a batch being asymptomatic carriers of disease would be extremely remote. The cutoff was intended only to identify batches of fish in the best condition, and would not imply freedom from any specific pathogen.

4.9.5 In the original IRA the NIWA facility at Mahanga Bay was proposed as the transitional facility receiving the fish after importation. However now Island Aquafarms wishes to maintain flexibility regarding the location of the transitional facility. Regardless of location, the facility to be used would be required to meet MAF Standard 154.02.06 for transitional facilities for ornamental fish and marine invertebrates and be approved by MAF for such purposes prior to the commencement of any imports of cultured juvenile kingfish. The standard requires, amongst many other conditions, that no fish shall be removed from the facility without MAF approval and that all waste water discharged from the quarantine facility must be either disposed of through an approved municipal sewerage system, or temporarily stored in a holding tank, chlorinated to recommended levels (minimum 200 mg/L active calcium hypochlorite for 1 hour), then neutralised (with sodium thiosulphate) and agitated for no less than 10 minutes prior to release into the environment. A useful reference for this procedure is Torgersen and Hastein (1995). It should be noted that Standard 154.02.06 requires the transitional facility and operator to be approved prior to application for the permit to import the fish.

4.9.6 Any batches of kingfish containing fish exhibiting dermal lesions should not be imported into New Zealand. This means examination of a minimum of 150 fish per batch up to a 100% inspection rate with 0 found in either case.

5. Additional safeguards

From feedback gained during the submissions process the following points are recommended for addition to the list of risk mitigation procedures listed in the IRA.

5.1 The water supply used to maintain juvenile kingfish destined for export to New Zealand must be exposed to a minimum level of 35 mWs/cm^2 UV irradiation.

5.2 The quarantine period for kingfish imported into the approved transitional facility would be a minimum of 4 weeks subject to each batch of fish exhibiting no symptoms of exotic disease or acute unexplained mortality. If acute unexplained mortalities are recorded or exotic disease is suspected, the facility operators are required to contact MAF NCDI via their 0800 809 966 toll free number and would be unable to remove the fish from the facility until testing proved they were not infected with exotic diseases.

6. Recommended safeguards to mitigate risks of disease introduction

To mitigate the risk of disease introduction associated with importation of juvenile kingfish from South Australian hatcheries into New Zealand, the following safeguards and procedures regarding the monitoring and treatment of batches of kingfish destined for export are recommended:

6.1 That batches of kingfish eggs destined for export are separated as early as possible from other fish reared in the hatchery, and are maintained in separate tanks in areas which are physically and spatially separated from other kingfish, particularly broodstock. Each batch of fish consigned for export should be able to be traced back to a spawning event that occurred on one particular day.

6.2 That detailed records are kept of the mortality rates of each batch of larval/juvenile kingfish and that these data are made available to the competent authority responsible for disease certification of the fish in Australia, the importing company and MAF Biosecurity and NCDI prior to disease testing in Australia.

6.3 That any batch of juvenile fish which experiences mortalities greater than 5%, due to unsubstantiated causes, following transfer from the hatchery to the nursery (up until sampling for disease is undertaken) should be classed as suspicious. Juveniles from such batches should not be exported and the cause of the higher than normal mortality rates should be determined.

6.4 That kingfish destined for export remain in the hatchery water supply (which is to be filtered to 1 µm and UV sterilised at all times), are fed hatchery reared or artificial food at all times and are not placed into Spencer Gulf at any time. The UV irradiation dose should at all times be greater than a minimum level of 35 mWs/cm^2.

6.5 That kingfish destined for export are maintained in seawater of at least 30‰ during rearing and transport until their arrival at the quarantine facility in New Zealand.

6.6 That a random sample of 150 fish from each batch of kingfish destined for export is tested for VER using OIE approved techniques (cell culture on SSN-1 cell line, or PCR), and also aquatic birnavirus and iridovirus by OIE approved methods (cell culture on BF-2 and GF cell lines, respectively).

6.7 That this testing is performed by a competent laboratory in Australia approved to undertake such work by AQIS and/or AFFA.

6.8 That kingfish from batches containing any fish that have ulcerative dermal lesions and/or ectoparasitic infections, or from batches which test positive for VER, aquatic birnavirus and iridovirus during routine testing should not be exported to New Zealand.

6.9 That kingfish from batches containing any fish which have tested positive (e.g. generated a CPE on SSN-1, BF-2 or GF cell culture media) for viruses other than VER, iridovirus

and aquatic birnavirus during routine testing, should not be exported to New Zealand and the identity of the virus(es) should be determined.

6.10 That after health certification in Australia, the remaining kingfish in each batch are placed in a container sealed with a MAF or AQIS approved seal, so there can be no water exchange during transport.

6.11 That after clearing customs the kingfish are transported to a MAF approved transitional facility which meets MAF Standard 154.02.06 for Transitional Facilities for Ornamental Fish and Marine Invertebrates. Upon reaching the quarantine facility the seal to the transport container should then be broken only by authorised MAF Quarantine officers. The quarantine period for kingfish imported into the approved transitional facility would be a minimum of 4 weeks subject to each batch of fish exhibiting no symptoms of exotic disease or unexplained mortality. If acute unexplained mortalities are recorded or exotic disease is suspected, the facility operators are required to contact MAF NCDI via their 0800 809 966 toll free number and would be unable to remove the fish from the facility until testing proved they were not infected with exotic diseases.

6.12 That quarantine should be performed as per the standards outlined in MAF Biosecurity Authority Standard 154.02.06. In particular, all wastewater discharged from the quarantine facility must be either disposed of through an approved municipal sewerage system, or temporarily stored in a holding tank, chlorinated to recommended levels (minimum 200 mg/L active calcium hypochlorite for 1 hour), then neutralised (with sodium thiosulphate) and agitated for no less than 10 minutes prior to release into the environment.

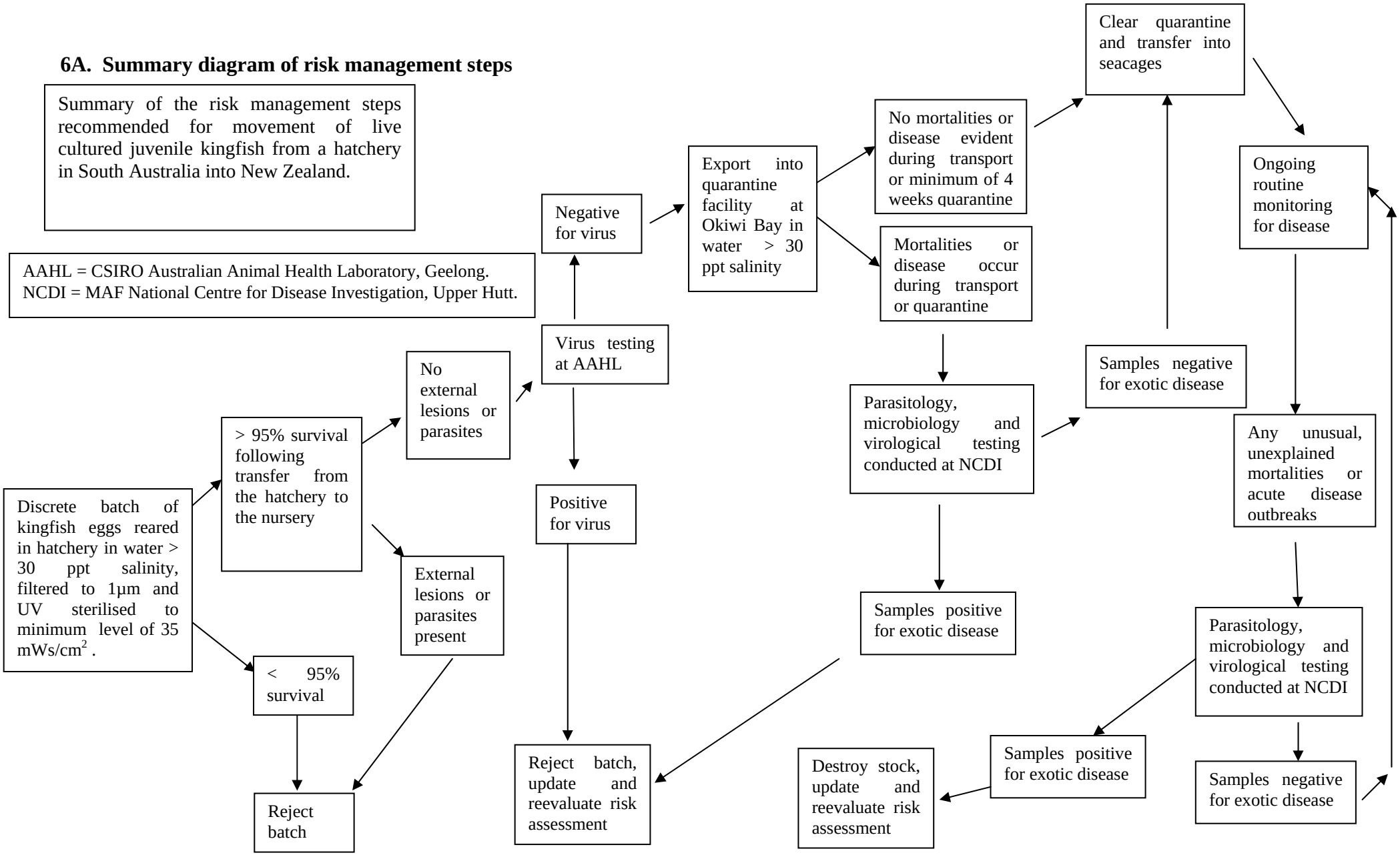
6.13 Any unusual or unexplained mortalities or acute mortality events which occur during ongrowing of fish obtained from Australia should be investigated by MAF NCDI via their 0800 809 966 toll free number using appropriate parasitological, microbiological and virological methods and a diagnosis obtained.

A chart summarising the various risk management steps recommended by this risk assessment is included on the following page (Section 6A).

6A. Summary diagram of risk management steps

Summary of the risk management steps recommended for movement of live cultured juvenile kingfish from a hatchery in South Australia into New Zealand.

AAHL = CSIRO Australian Animal Health Laboratory, Geelong.
NCDI = MAF National Centre for Disease Investigation, Upper Hutt.



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7. Appendix 1. The submissions

Paul Batten

P.O.Box 7120
Tikipunga
Whangarei
paulbatten@xtra.co.nz
0276646554

Martin Van Ginkel,
Technical Adviser,
Risk Analysis,
Biosecurity Authority,
Ministry of Agriculture and Forestry
P.O.Box 2526
Wellington.

Dear Sir,

Thank you for the opportunity to submit on this topic.

Firstly who am I,
Secretary for the Northern Amateur Fishers Association and delegate to the New Zealand Recreation Fishing Council (NZRFC),
Delegate to and member of the management Committee of the New Zealand Big Game Fishing Council (NZBGFC),
Northland Public Sector representative to the NZRFC,
President of the Mangawhai Boating and Fishing Club and delegate to NZBGFC & NZRFC.

I am very concerned with this proposal as sent to me, received 08-02-2003. I am not aware of who else received this proposal as none of my fellow national body representatives that I spoke to have seen this document. I e-mailed the covering letter and web site to them in response. The cut off date of the 28th February has given us little time to respond in detail.

If you haven't received a letter from the following could you please sent the whole package to via e-mail;

Scott Macindoe scott@wilmac.co.nz
Sheryl Hart theharts.raglan@actrix.co.nz
John Holdsworth johnno@igrin.co.nz

John Chibnall jchib@xtra.co.nz
Ross Gildeon falla@ihug.co.nz
Geoff Rowling Geoff.Rowling@xtra.co.nz

Also to these respected parties;
NZ Forrest and Bird
NZ Fish and Game

NZ Outdoor Recreation Party

NZ Forest and Game Consultation Group.

My personal thoughts are;
Kingfish (*Seriola lalandi*) are too important to New Zealand Recreational fishers, Sports fishers, Game fishers, and customary gathers to allow the importation of diseases or the risk of disease importation. The recent abandonment of the Peach Cove Fish farm project is an example of how the public view the possible discharge of disease infected fish food, fish faeces, the farmed fish escaping into the wild as potential danger to our wild stock fisheries. New Zealand is the best place in the world to fish for Kingfish up to world record sizes, why should we allow something that could jeopardise our fishery.

Therefore I am apposed to the importation of hatched kingfish (juvenile) from any part of the world.

I am apposed to open water sea cage fish farming.

And are left wondering what is wrong with the kingfish being hatched at the NIWA facility located at Ruakaka northland NZ.

Yours truly,
Paul Batten.

From: <jperry@doc.govt.nz>
To: <PharoH@maf.govt.nz>
Date: 29/01/2003 09:56:35
Subject: WGNCR-41512 - comments on yellowtail kingfish ira

Kia ora Howard,
Please find attached DOC's comment on the yellowtail kingfish ira.
Regards Joanne

Comments on

"IMPORT RISK ASSESSMENT: Juvenile Yellowtail Kingfish (Seriola lalandi) from Spencer Gulf Aquaculture, South Australia."

General comments

The Import Risk Assessment on juvenile yellowtail kingfish is comprehensive and addresses the potential affects the importation may have on yellowtail kingfish within New Zealand waters. There are however a number of issues that require further clarification.

Specifically

1. Section 1.3 Commodity description - processing

This section of the assessment indicates that juveniles will be reared in seawater filtered to 1 micron and then UV sterilised. However Section 5.5 paragraph 4, the assessment indicates that,

"in areas of Canada, where K. thyrsites is enzootic, Atlantic salmon held in landbase tanks with a water supply filtered to 1 micron can still become infected...."

Based on this second comment, what level of confidence do we have that the water treatment proposed will ensure that no unwanted organisms will be entering with the imports?

2. The assessment indicates that any batch of juvenile fishes which experiences a cumulative mortality of greater than 5 % will not be exported. What level of confidence is there that 5 % mortality is a sufficient cut-off level? What level of risk is there that there will be large number of asymptomatic fish or fish with low level infection in these batches?

3. Section 1.3 Commodity description - processing

The assessment states that

"subsamples of fish from each acceptable batch will be tested for disease etc and declared clinically healthy and "Free" from diseases listed in the Import Health Standard for Kingfish".

In section 5 of the assessment, it is indicated that various diseases will be tested for and that a sample size of 150 fishes will be taken per batch for this testing (if each batch consist of 15,000 as indicated in the report, this sample size equates to 1 % of the total sample). The assessment does not provide any information on the confidence levels for this sample size.

What level of confidence is there that this sample size is sufficient to rule out the presence of the various diseases tested for?

4. Section 1.3 Commodity Description - Processing Premises

The assessment indicates that the fish will remain in quarantine for 4 weeks until such a time as MAF Quarantine Officers release the shipment. What level of confidence do you have that four weeks quarantine is sufficient to ensure that all the potential diseases have expressed themselves? The assessment indicates that fish may remain asymptomatic. On release of the

fishes to the aquaculture facility, will follow up testing procedures be in place should the fishes exhibit disease at a later stage? Are the importers required to notify MAF of any disease outbreaks after release?

5. Food source.

I note that the MAF Standard 154.02.06 does not indicate where the food source for the quarantine fish is obtained from. Is the food for the fish in quarantine sourced within New Zealand, or is it supplied by the importer? If the food source is provided by the exporter and comes from Australia, what measures are in place to ensure that does not contain contaminants and unwanted organisms? This should be clarified in one of the IHSs.

6. Related species

The IRA generally only considers diseases that may affect the New Zealand population of yellow tail kingfish. There appears to be only a limited assessment of the diseases listed on indigenous marine species in New Zealand. There is little or no risk assessment for indigenous freshwater/estuarine species or amphibians. I note for example that a recent Australian Import Risk Analysis on Live Ornamental Finfish indicates that iridoviral diseases of freshwater ornamental fish are known to affect frogs and salamander. While this example relates to freshwater fish, what assurance do we have that the potential marine pathogens will not affect our indigenous freshwater/estuarine species or amphibians? The assessment indicates that the fish are to be reared in land based cages. Should a disease not be picked up in the quarantine procedure, untreated waste water/effluent from these rearing facilities may pose a potential risk pathway for these species if released directly into our waterways. This risk would be of greater concern should the waste water be released into an estuarine environment.

From: "J Mikoz" <j-mikoz@xtra.co.nz>
To: "Martin Van Ginkelm Kingfis" <vanginkelm@maf.govt.nz>
Date: 26/02/2003 00:43:45
Subject: Aalysis for juvenile yellowtail kingfish

Hi Martin

Re importing kingfish

I have had a quick read of the PDF file on your site. It only mentions the possible spread of disease from the imported fish. Can you tell me what research has been done into the genetics of the fish in Australia and New Zealand?

This raises the whole issue of genetics and the effects of the possibility of farmed fish with a different genetic base being
"accidentally" released into a wild stock and the real impact that they would have on our resident wild stock. These farmed fish would not have the genetic knowledge to travel the seasonal migration that resident kingfish here already possess. If accidentally released in large numbers what impact would that have on the resident kingfish, where would they migrate to spawn, Australia ?

Are you aware of the overseas research into this question on other farmed wild fish specie? If so has there been any research done to establish what gene of kingfish we have here and if so how many different genes do we have? Is it the same as Australia?

Has this question been discussed?
Can I have a copy of the information please?

Thanks
Jim Mikoz
Secretary
Wellington Surfcasting and Angling Club
Wellington Recreational Marine Fishers Association
Honorary Vice President New Zealand Angling and Casting Association

A private consultant has conducted a risk analysis for juvenile yellowtail kingfish (Seriola Lalandi) From Spencer Gulf Aquaculture, South Australia
* Import Risk Assessment: Juvenile Yellowtail Kingfish (Seriola Lalandi) From Spencer Gulf Aquaculture, South Australia[PDF 169k]
Submssions close 28 March 2003 and should be forwarded to;
Martin Van Ginkel, Technical Adviser, Risk Analysis
MAF Biosecurity Authority
Ministry of Agriculture and Forestry
PO Box 2526
Wellington
New Zealand

Fax: +64 4 474 4133
Email: vanginkelm@maf.govt.nz

CC: "Scott Williamson MoF" <Williams@fish.govt.nz>

From: "Bert Lee" <bert@charterfishing.co.nz>
To: <vanginkelm@maf.govt.nz>
Date: 27/02/2003 10:49:25
Subject: kingfish

Bert Lee
Tolaga Bay East Cape Charters
PO Tolaga Bay
Ph-Fax 06 8626715
Email bert@charterfishing.co.nz
Web site www.charterfishing.co.nz
27 February 2003

Martin Van Ginkel, Technical Adviser, Risk Analysis
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As a charter operator who targets kingfish on a catch and release basis for both local and overseas clients I have strong interest in the sustainability of kingfish stocks. Years of targeting kingfish have given me a knowledge and understanding of kingfish far beyond most. I have participated in studies by NIWA on spawning and egg production and around 30% of all kingfish tagged in NZ over the last eight years have been tagged from my boat with the percentage in one year being 69%.

I am in favour of farming of kingfish however I question the need or wisdom of importing juvenile fish from Australia.

It is my understanding that NIWA is working on kingfish aquaculture at the Bream Bay facility. I believe they have already produced several thousand juvenile kingfish and are looking for partners to progress this work through to commercial production. There is no reason why the applicant company cannot work with NIWA in the production of juvenile fish from local brood stock.

The conclusion at the end of 1.1 is not based on data only assumption

There is no evidence that juvenile kingfish cross the Tasman sea and only proof that 5 large kingfish have made the trip and then only 3 from A to NZ. The fact that kingfish in NZ grow to a larger size than in Australia points to differences that could be lost by mixing with escaped Australian sourced stock.

There has never been sea cage aquaculture without escapes and with the proliferation of seals there is every likelihood that sea cage security will be breached by these animals with a mass escape occurring.

Any risk of disease or parasite introduction even small is too much to take when it comes to such an important sport fish. The wild population of kingfish in NZ brings in many millions of dollars at present from both commercial and recreational catch, to put this at any risk is unacceptable.

The only advantage of such an importation may be to speed up the farming process by one year rather than wait for local juvenile stock to become available. Short term commercial gain is no reason to put any fishery under even minimal risk.

Bert Lee

NEW ZEALAND BIG GAME FISHING COUNCIL

(INCORPORATED)

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28 March 2003

Mr Martin Van Ginkel
Technical Adviser
Risk Analysis Biosecurity Authority
Ministry of Agriculture and Forestry
P O Box 2526
WELLINGTON

Dear Martin

Re: IMPORT RISK ASSESSMENT: JUVENILE YELLOWTAIL KINGFISH FROM SPENCER GULF AQUACULTURE, SOUTH AUSTRALIA

Please accept the following submission on behalf of the NZ Big Game Fishing Council. We are a national organisation representing 59 fishing clubs with a total of 32,000 financial members.

The risk assessment document circulated appears to cover most aspects where knowledge exists adequately. However, it also states that there is a scarcity of information on diseases of kingfish in Australia and New Zealand which has made assessment of the risks involved difficult.

In particular there appears to be uncertainty about the potential exposure and consequences of introducing iridvirus, Kudou thyrsites and VHS through live importation of kingfish.

The wild yellowtail kingfish fishery is very important to our members. New Zealand has a reputation for a world-class recreational fishery and we hold most of the International Game Fish Association (IGFA) world records for this species. A slight or undetermined risk to kingfish is of grave concern to our members.

In our experience New Zealand yellowtail kingfish tend to grow larger that those in Australia. This is supported by the IGFA records. This may be a result of some genetic difference, environmental factors, or both. Just because a study of microsatellite and mitochondrial DNA found significant genetic divergence between New Zealand and Australian fish does not mean that the stocks are genetically identical.

There are records of tagged fish moving between countries in both directions. Unlike the Australian study, reported by Gillanders, the New Zealand gamefish tagging programme does tag mature kingfish. In recent years about 700 kingfish are tagged in New Zealand per annum and about 45% of releases and 50% of recaptures are fish 100 cm and larger (John Holdsworth, Blue Water Marine Research Ltd pers. comm.). None of these fish have been recaptured in Australia.

NIWA are rearing kingfish at Bream Bay. Last week they released fingerlings into the wild as they had no market for them. Given the rigorous testing and monitoring required to import kingfish surely it is better for all concerned to use locally bred stock.

Thankyou for considering this submission.

Ros Nels

pp Jeff Romeril
PRESIDENT

SUBMISSION ON:

IMPORT RISK ASSESSMENT: Juvenile yellowtail kingfish (*Seriola lalandi*) from Spencer Gulf Aquaculture, South Australia

Submission by:
The New Zealand King Salmon Company Limited
11-18 Bullen St
NELSON

Background

The New Zealand King Salmon Company is actively growing salmon on its seafarms in the Marlborough Sounds. One of the more significant risks to the future well being of the company is that

of disease. The company has within its operation significant local and international experience and is able to comment with authority on the risk assessment.

In New Zealand salmon farming is a moderate, but locally very important industry. We have the enviable position of farming King (Chinook) salmon in a 'disease free' environment. There are some pathogens and parasites that can affect King salmon in New Zealand, but these do not have any commercial significance and are readily managed. The disease free status of the New Zealand salmon farming industry is a critical point of difference in a crowded world market. This unique status is envied by overseas producers and allows New Zealand to promote its salmon as antibiotic and vaccine free. There are also commercial advantages – having no diseases of significance means that we can compete with the more efficient and more commonly grown Atlantic salmon in very competitive overseas markets. If there were disease issues that had to be faced then it is probable that the commercial farming of salmon in New Zealand for export would not be viable.

Guarding the disease free status of marine finfish farming is therefore very important to TNZKSC (King Salmon).

King Salmon has recently reviewed the possibility of growing kingfish at our farms in the Marlborough Sounds. However after reviewing the available evidence it was decided that the potential hazards and associated risks of developing this type of cage culture was not appropriate as there was not sufficient information to ensure that there would not be significant detrimental commercial and environmental impacts. This was despite the proposal being to use New Zealand produced kingfish juveniles.

The current application has additional uncertainty as it seeks to import live fish from Australia to New Zealand – rather than use fish sourced from New Zealand. This increases our concerns associated with this development and we outline these in this submission.

King Salmon objects to the importation of live juvenile kingfish from Australia to New Zealand and recommends that transfers not be permitted until such time as the potential hazards or risks associated with these hazards are adequately assessed. King Salmon objects on the grounds that:

1. There has been an inadequate 'Import Risk Assessment' process. It does not cover all of the potential hazards and the risks associated with these and is therefore subject to error
2. The benefits of allowing this import have not been outlined in comparison to the risks.
3. The disease profile of the kingfish population in Australia and New Zealand is not known and at best is very limited. There should be a study of the diseases and practical investigation of diseases of kingfish in NZ and Australia to establish if any are likely to flare up once commercial, intensive cage culture commences.
4. The risks to the wild kingfish population, other native NZ wild fish and to existing commercial finfish farming operations needs to be considered. This has not been adequately addressed in the Import Risk Assessment.

Issues

1) In section 1.1 of the Import Risk Assessment the stock structure of the Australian and New Zealand kingfish populations is described. It is suggested that there is wild transfer of fish between Australia and New Zealand and therefore disease risks are likely to be similar. Given that the disease surveys (see point 2 of this document) are inadequate King Salmon does not accept this analysis. There is a moderate to high probability of there being unidentified diseases in the Australian kingfish population that are not present in the New Zealand population. Moreover the likelihood of significantly diseased fish moving between countries naturally is far less of a risk than that of transferring disease in farmed fish.

In this section of the Assessment there is a suggestion that juvenile transfer, via ocean currents is theoretically possible – King Salmon points out that it is also theoretically possible that this is not the case. It is also suggested that large-scale trans-Tasman migration of mature kingfish is also possible and uses the tag recovery evidence to back this up – but fails to point out that large scale movement may not be the case. The issue is that the Assessment is not balanced, it is presenting the positive without adequately addressing the negative associated with this application.

2) Current knowledge with respect to the disease status of New Zealand and Australian kingfish stocks is very patchy and inadequate. The Import Risk Assessment acknowledges this (para 3.1 and para 3.2). The Assessment also highlights the possibility that as kingfish farming 'matures' then new diseases may emerge (para 3.4). King Salmon agrees with this and believes that the Import Risk Assessment has failed to address this issue and the potential for novel diseases to emerge in the new intensive cage environment and then jump species to wild fish populations or to other existing commercial finfish farming operations. This is a critical issue.

   The application to import live fish from Australia appears to assume that novel, undetected, diseases in Australian kingfish will be the same as novel, undetected diseases in New Zealand farmed kingfish. No evidence has been produced to support this and King Salmon does not accept this scenario. In King Salmon's view there is a moderate to high risk that novel and undetected diseases of kingfish in commercially reared environments will be different. Once a disease outbreak occurs in the intensive farmed environment there is then the possibility of its transfer to wild kingfish or other species.

   This is very different to the Assessments approach that assumes that diseases present could transfer from Australia to New Zealand via wild carriers. The Assessment therefore ignores this potential risk pathway. In King Salmon's view this is not appropriate.

   As an example – amoebic gill disease (AGD) is a major problem for the farmed salmon industry in Tasmania but is not a commercially significant problem in the New Zealand environment.

   A more thorough analysis of this risk needs to be undertaken.

3) Quarantine time – the Assessment indicates that the juvenile kingfish will be held in a quarantine facility for a period of 4 weeks. No evidence has been produced that explains why 4 weeks is an appropriate quarantine period. We understand that for salmonids the quarantine period would be 2 generations – 6 years. This appears to be a very different standard. The Assessment needs to clarify why 4 weeks is an acceptable time for quarantine and why all potential diseases are likely to present themselves within this timeframe. The Import Risk Assessment has failed to do this.

4) Mortality levels – the Assessment suggests that all batches of fish with greater than 5% mortality should be rejected for export. There is no reasoning as to why 5% has been deemed appropriate and this should be established. Why has a lower threshold been rejected? What period of life is the mortality being measured over? – i.e egg to 3 grams survival, hatch to 3 grams or some other period – this has not been defined and the reasons for selecting the period have not been outlined.

5) Screening process veracity – the Assessment puts forward a suggested screening programme for kingfish juveniles. King Salmon submits, given the unknown nature of the risks, that the proposed screening process is inadequate and is not likely to detect known or unknown disease risks. In particular:
   a) Screening of batches of fish is proposed as adequate – this is not acceptable. As an example, in the salmon farming industry if an exporting facility is found to hold diseased fish no eggs or juveniles can be exported from the whole facility.
   b) No screening of broodfish is proposed – this is not acceptable. As an example, in the salmon farming industry eggs and juveniles cannot be exported if they are found to have come from parents that are demonstrated to be carriers of a disease. This is because many diseases can be vertically transferred from parents to offspring both by external

contamination of the eggs and by internal contamination of the eggs (especially with respect to viruses).

c) There are no inspection regimes to ensure the veracity of exporters declared information. The inspecting authority (and therefore the importing Country) would need to take as read declarations with respect to mortality levels, the source of fish taken from different batches, the physical separation of fish destined for export and those destined for local use and the effectiveness of the UV sterilisation process.

A more robust inspection regime is required to ensure that declared practices are indeed occurring. There should be a period of time required prior to approval, where the declared disease free status of the facility can be verified prior to imports from the facility being allowed. [This is similar to the requirements that King Salmon faces when exporting dead salmon to Australia for human consumption – the health status of our farms must be tested (and proven to be negative) for a period of 3 years prior to exports commencing. Live fish are much more potent vectors of disease and a similar or more robust testing regime should be in place.]

As an example of the disease risks associated with the transport and use of live organisms the Chilean experience with salmon in contrast to the New Zealand experience is valid. In Chile salmon eggs that are imported from the Northern hemisphere must come from sites with no disease and from broodstock that have been regularly tested throughout their 3 or 4 year life cycle and proven to be disease free. Eggs are screened prior to transport for particular diseases. Parent fish are all screened for relevant diseases. Despite these safeguards Northern Hemisphere diseases have a significant negative effect on the Chilean industry and all the major Northern Hemisphere diseases are present in Chile. In New Zealand there have been no live egg or salmonid imports since approximately the 1940's. We have no commercially significant diseases affecting any of the salmon operations in New Zealand. This case history needs to be taken into account when assessing the hazards and risks associated with developing live kingfish transfers to New Zealand from Australia.

6) The Assessment discounts the risk of changes to the genetic diversity of the kingfish population in New Zealand. This is not a valid assumption as no evidence has been produced to demonstrate why this is correct.

7) There has been a comprehensive list of known diseases of kingfish compiled – but this is relevant, largely, to Japanese waters. The diseases identified in New Zealand and Australia are acknowledged to be very limited and in New Zealand samples taken have mostly been opportunistic and not scientifically defensible in identifying all potential disease. The number of samples taken from Australian waters appears even more limited and again in some cases not recorded (section 3.1). This list does not assess the risk of novel, unknown, diseases developing that may affect wild fish or existing commercial finfish farming operations.

   Section 1.2 Identifies that juveniles reared in a hatchery situation may be exposed to "disease agents (including viruses, bacteria and protozoa) which would not normally be encountered by naturally spawned kingfish in the epipelagic oceanic environment".

8) Disease screening does not guarantee disease free status – the Assessment acknowledges that the screening for disease does not preclude there being pathogens in the population that has been tested (section 3.4) to an unidentified level of significance. This makes it very difficult to have certainty with respect to importing fish from Australia to New Zealand that there will not be unforeseen/undetected problems.

9) Provisional status of recommendations – the Assessment suggests that the lack of information means that the recommendations need to be considered as provisional. However it gives no clear indication of the review period, what may trigger a review and what may need to change. King Salmon submits that these factors must be considered prior to allowing the import of live fish for commercial, intensive culture.

10) Diseases not considered further – the Assessment takes the position that if a disease is not known / recorded in New Zealand or Australian waters then no assessment of the risk associated with it is required. Given the scarcity of information in terms of fish disease presence in the waters of Australia or New Zealand this appears to be a narrow and naïve approach. A review of all potential pathogens should be undertaken, with particular focus on diseases of salmonids as these are currently reared in New Zealand and a particular focus on diseases that may impact wild fish populations in New Zealand. This section 4 of the Assessment needs to be completely reviewed.

11) Some diseases identified as occurring in both New Zealand and Spencer Gulf (eg. Section 4 kingfish diseases in Spencer Gulf) have been discounted as negligible additional risk, this does not address the potential for strain specific differences to manifest themselves under different environmental and species conditions. Section 5.1 identifies the potential to introduce an exotic strain of birnavirus

12) King Salmon does not agree that the risk assessments that have been completed in section 5 of the report are adequate nor a full and complete list of those diseases that should be addressed. The assumptions determined are subjective and unacceptable. However the main area of concern identified in this risk assessment is the inadequate risk management measures and these have been discussed earlier in this submission.

13) Inspection of mortalities – the Assessment suggests that all mortalities should be screened by NCDI that occur during transfer or while in quarantine. King Salmon suggests that prior to any approval that agreed procedures for the preservation of samples, the frequency of mortality retrieval, the procedures for sample transportation to NCDI etc. need to be developed and agreed. It would also be recommended that if, for any reason, mortality levels in the imported juveniles reach above a predetermined level then the whole batch should be destroyed and disposed of in a suitable manner.

King Salmon Position

As finfish farmers King Salmon supports the development of the finfish aquaculture sector in New Zealand. Indeed we are actively engaged in this process. However the importation of live fish from other countries is an inherently risky process and should only progress with extreme caution. The experience of the Chilean salmon farming industry is testament to this fact. It is very important that commercial cage culture develops in a safe manner – this application to import live kingfish juveniles from Australia to New Zealand does not adequately assess the potential hazards or the risks associated with these hazards. Until this has been adequately done the application to import live kingfish from Australia should be declined.

7 April, 2003

Martin Van Ginkel,
Technical Adviser, Risk Analysis
MAF Biosecurity Authority
Ministry of Agriculture and Forestry
PO Box 2526
Wellington

Import Risk Assessment for juvenile yellowtail kingfish (*Seriola lalandi*) from Spencer Gulf Aquaculture, South Australia

Dear Martin

1. Thank you for the opportunity to provide feedback on the Import Risk Assessment for juvenile yellowtail kingfish (*Seriola lalandi*) from Spencer Gulf Aquaculture, South Australia

2. This submission is made by the New Zealand Seafood Industry Council (SeaFIC). SeaFIC represents the generic interests of the New Zealand seafood industry, a sector that includes fishers, marine farmers, seafood processors, wholesalers, retailers, and exporters. The seafood industry:
   - Provides direct employment for over 11,00 people, and many more indirectly;
   - Is New Zealand's fourth biggest export goods earner, returning $1.43 billion dollars in export earnings to the New Zealand economy annually; and
   - Contributes $4.5 billion annually in total revenue from seafood and all associated businesses.

3. SeaFIC plays a leading role in developing and presenting the seafood industry's response on all policy proposals affecting the industry. As the largest commercial user of natural resources within New Zealand's Exclusive Economic Zone (EEZ), the seafood industry has a particular interest in the maintenance of New Zealand's marine biosecurity.

4. SeaFIC has a number of concerns with the Import Risk Assessment which are outlined below. We would also like to note our previously raised concerns regarding the seemingly untargeted nature of your consultation process. We appreciate the opportunity to present a late submission and thereby ensure adequate feedback from industry on this assessment. We repeat our offer to assist you in future when consulting on issues of relevance to the seafood industry.

Potential consequences

5. SeaFIC is concerned that the Import Risk Assessment fails to adequately assess the potential consequences following a risk event occurring. While an import risk assessment does not require precise quantification of potential effects on the economy or environment, the analysis, should however, be expected to establish the possible economic and environment effects that could arise from the introduction, establishment or spread of an introduced disease. This would include;

   - the potential damage in terms of loss of production or sales in the event of the entry, establishment or spread of disease; and
   - the costs of control or eradication in New Zealand.

6. In the absence of this information it is impossible to assess whether the conditions proposed adequately reflect both the risks of introduction of disease, and the potential effects that may occur as a result.

New Zealand Standards / Best Practice

7. The field of biosecurity in aquaculture production systems is one which is evolving rapidly. Consequently, our understanding of what constitutes best practice to address biosecurity risks posed through the transfer of live aquatic animals, is also continually being challenged. Our lack of knowledge and uncertainty surrounding the ability to identify parasites and pathogens in aquatic animals underlies the most common concern raised by the industry, that of the potential to unknowingly introduce a disease that was either not tested for, or that was not conspicuous prior to release from quarantine. The likelihood of releasing an unidentified disease of pathogen was not explicitly dealt with in the assessment. We question what steps are taken, prior to importation and post release from quarantine, to minimise the risk of such an event occurring.

8. Feedback from the recent AIP workshop "*Biosecurity in Aquaculture Production Systems: Exclusion of Pathogens and other Undesirables*" recommended that New Zealand should consider adopting standards similar to those used in Canada[1]. Canadian standards allowed only for the importation of eggs with captive quarantine for the entire first generation. These standards were promulgated from the understanding that pathogens were more likely to be introduced from fish than their eggs. A further recommendation from the workshop was for New Zealand to develop containment standards that aim to minimize the dissemination of pathogens to the outside environment.

9. It is not clear whether these recommendations have been considered by New Zealand or resulted in changes to way New Zealand approaches aquatic biosecurity. In the continued absence of New Zealand standards from which to evaluate such an application, SeaFIC is keen to ensure that the conditions to minimize the risks of introducing disease outlined in the Import Risk Assessment represent our current understanding of best practice. The Import Risk Assessment does not place the proposed conditions within a context of alternative approaches or how they relate to best practice. We are in the unfortunate position of not being able to dismiss concerns that the proposed conditions do not adequately address industry concerns.

10. Until these issues are clarified we consider that it would be inappropriate to issue an import health standard based on the conditions set out in this risk assessment.

If you have any queries or would like to discuss any of these issues further, please don't hesitate to give me a call.

Yours sincerely,

John Willmer
Policy analyst

[1] Webb S, 2001. Report on the AIP Workshop Biosecurity in Aquaculture Production Systems: Exclusion of Pathogens and other Undesirables. Oceanic Institute Centre for Applied Aquaculture and Marine Biotechnology, Hawaii, 23-26 July 2001. Cawthron Report 678. Nelson, New Zealand.

From: "Mark Feldman"TurtleDoc@xtra.co.nz

To: vanGinkelM@maf.govt.nz

Date: 21/03/2003 16:38:37

Subject: yellowtail

Dear Martin:

I read about the importation of juvenile kingfish in "Biosecurity."

You may be aware of the epidemic of a virus (herpes?) a few years ago among pilchards that killed many millions of fish. At that time there was considerable speculation about the disease and few facts. One concern was that the virus was being spread by farm reared fish that were fed pilchards.

Has this factor been considered regarding the importation of yellow-tail from Australia (where the epidemica seemed to originate)?

Sincerely,

Mark Feldman M.D.

From: Sean Newland
To: van Ginkel, Martin
Date: 11/02/2003 15:19:37
Subject: Kingfish IRA

Martin

Thank you for providing us with a copy of the IRA: Juvenile Yellow2tail Kingfish (Seriola lalandi) from Spencer Gulf Aquaculture, South Australia and apologees for not having provided comment during the internal review process (problems with timing around holidays and other issues).

This would seem to be a very good identification and analysis of the potential risks posed by the proposed importation however there are a couple of points that I am unclear on from the document.

1) Period of quarantine in NZ. Should be stated as a "minimum" of four weeks subject to all batches exhibiting no symptoms of exotic disease or unexplained mortality etc. Couldn't find the rationale for the 4 week quarantine period so hard to know whether this is linked to the optimum time for symptoms of the diseases of concern to express themselves or not? This sould be stated.

2) Couldn't find the rationale for the sample sizes per batch tested for specific pathogens - presume this relates to the specificity of the tests, the level of confidence we want in the result and the size of the batches? This should be stated.

3) How does one "batch" differ from another? Are these distinct groups that have been raised in isolation (in which case the consequences of detecting pathogens as stated within the IRA make sense) or simply groups formed for transportation purposes from the same general stock (in which case the consequences of pathogen detection being related only to that batch would not seem logical)?

4) 5% mortality as an indication of health. No rationale found as to why 5% mortality should be accepted as the baseline for indication of health problems. This should be stated. Also, does this indicate freedom from (or extremely low prevelance of) the pathogen or just minimal expression of symptoms and mortality which may be related to the level of stress the fish is or isn't exposed to?

5) It is not indicated what std the NIWA facility is accredited to but presume 154.02.06 as it is the only aquatic transitional facility std (note - as far as I am aware Mahanga Bay facility is only approved for 154.02.17 Biological Products and 154.03.02 Containment of microorganisms). This should be stated.

6) What is the acceptance level etc. for kingfish with dermal lesions etc. (as provided as a mitigation measures) - does this require a 100% inspection rate with 0 found or sampling with an acceptance level? Should be indicated.

I was unable to find any information to indicate that their are other pests or diseases associated with kingfish in Australia that may pose a threat to NZ indigenous fauna.

Given reasonable rationale and clarification for the points raised above the proposed measures would seem to be adequate to mitigate any identified risks to NZs indigenous fauna.

Given that the water accompanying the consignment and the containers used will be covered by other, preexisting IHSs the risks posed by hitch hiker type organisms would seem to be negligible. I would however welcome the oppertunity to discuss the points raised above at some stage in the near future.

Thank you for the oppertunity to provide comment on this IRA.

Regards

Sean

Sean Newland
National Adviser, Indigenous Flora and Fauna