

Review of the Undaria Commercial Harvest Policy

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All submissions must be received by MAF Biosecurity New Zealand no later than **5pm on 31 July 2009**.

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1. Summary

Undaria pinnatifida (undaria), an Asian seaweed, was accidentally introduced to New Zealand in the mid 1980s. It is now found in most ports and harbours along the east coast of New Zealand as well as Taranaki, the top of the South Island, Stewart Island and Snares Islands/Tini Heke.

Undaria is likely to have moderate adverse impacts on the values that marine biosecurity aims to protect, particularly environmental values through, among other things, reduction in species richness, changes to native habitats and reduction in species abundance. As an invasive species, impacts may be more or less severe in different locations.

Some stakeholders have indicated an interest in widening the type and scope of undaria commercial activities allowed. Currently only limited commercial harvest is allowed. Potential commercial market opportunities for undaria include: human consumption (in the form of Wakame); health food; pharmaceuticals; fertiliser and fish food (e.g. paua food).

Despite limited active management to control the impacts of undaria, allowing greater commercial utilisation of undaria could potentially exacerbate its impacts by increasing its abundance and spread around New Zealand.

The objectives of this review are:

- to assess the feasibility of allowing commercial harvest and/or farming of undaria while not significantly increasing its adverse impacts on existing or new sites; and
- to determine the most efficient and effective legislative mechanisms to manage any undaria commercial regime that may be developed.

The following options have been developed and considered within this document.

- Option 1: Harvest as part of control or by-product operations only (Status quo)
- Option 2: Harvest anywhere undaria naturalised, but excludes farming
- Option 3: Harvest anywhere undaria naturalised, farming only in heavily infested areas.

MAF Biosecurity New Zealand's (MAFBNZ) initial judgement is that it should be possible to allow greater commercial utilisation of undaria, than currently permitted by the status quo, without significantly increasing its adverse impacts. MAFBNZ considers that the regimes outlined in options 2 and 3 balance the biosecurity risks against the biosecurity and wider benefits by:

- not significantly increasing the biosecurity risk over and above that already occurring as a result of other farming and non-farming activities;
- continuing to allow commercial harvest as part of control and by-product operations, which could reduce the incidence and impact of undaria in localised areas; and
- providing for a level of take that could potentially allow the development of sustainable commercial opportunities.

MAFBNZ is seeking submissions on the options outlined in this discussion document. The key issues that MAFBNZ seeks comment on, and the process for providing a submission, are outlined in section 5 of this document. Questions have been included throughout this document to help facilitate feedback, however, comment is welcome on any aspect of the analysis and proposed options presented. The questions are also collated, for ease of reference, in Appendix 1.

2. Background

2.1. THE SEAWEED – UNDARIA

Undaria is not native to New Zealand but is native to the cold temperate regions of Japan, China and Korea. In its native range undaria is an “annual plant”, dying back in mid-summer. In New Zealand and Australia undaria does not appear to act like an “annual plant” with mature plants being found year round (Russell et al 2008).

Undaria was first detected in Wellington, New Zealand in the mid-1980s. Undaria is now found in most ports and harbours along the east coast of New Zealand, as well as Taranaki, the top of the South Island, Stewart Island and the Snares Islands/Tini Heke (see map in Appendix 2). New Zealand’s current distribution is a combination of spread from the initial introduction as well as additional introductions from its native range. Research has determined that there are now eight different strains (haplotypes) of undaria in New Zealand. The North Island and the top of the South Island only have a single strain, while the additional seven strains are found in the South Island. The differences between the strains are genetic rather than being based on the plant’s physical characteristics (morphology) (Uwai et al 2006).

Undaria is well adapted to invade exposed coastlines and can establish within a broad range of niches in wave-exposed areas including rockpools, low intertidal, shallow intertidal, native kelp forests and in low light areas beyond the vertical extent of our large native algae (Russell et al 2008). Undaria also has the potential to modify the marine communities in these areas (Russell et al 2008). Undaria’s current range within New Zealand is *greater than expected and appears to be expanding* (Russell et al 2008). For more information on undaria see www.biosecurity.govt.nz/pests/undaria.

2.2. DEFINITIONS

This document differentiates between harvesting and farming and states that under options 2 and 3 undaria can be harvested where it is naturalised. This document also uses terms defined in legislation. For clarity, definitions are outlined below.

- **Harvesting** – the process of gathering undaria, for commercial purposes, from areas where it has “naturalised” through unintentional spread.
- **Farming** – the process of actively seeding and/or breeding undaria for commercial purposes.
- **Naturalised** – where undaria has adapted or acclimatised to a new environment and established as if native.
- **Unwanted organism** – defined in section 2(1) of the Biosecurity Act 1993 as any organism that a Chief Technical Officer believes is capable or potentially capable of causing unwanted harm to any natural and physical resources or human health. (A full definition is outlined in section 2(1) of the Biosecurity Act).
- **Pest** – defined in section 2(1) of the Biosecurity Act as an organism specified as a pest in a pest management strategy.
- **Regional Pest Management Strategy** – a strategy, made under Part 5 of the Biosecurity Act for the management or eradication of a particular pest or pests. A regional council or any other person may prepare a proposal for a regional pest management strategy.
- **Regional Coastal Plan** – a regional council must prepare a regional coastal plan for coastal marine areas in that region under section 64 of the Resource Management Act

1991. The plans deal with coastal issues such as controlling activities and possible adverse effects from activities on the coastal environment.

For more information on the legislative terms described above see www.legislation.govt.nz

2.3. CURRENT MANAGEMENT

2.3.1. Management to control impacts

There is limited active management to control the impacts of undaria. There are no active nationally led management initiatives for undaria and only limited regional ones.

At a national level, undaria was declared an unwanted organism under the Biosecurity Act in March 2000. As an unwanted organism it is illegal to knowingly spread or actively breed undaria without the explicit consent of the Chief Technical Officer under the Biosecurity Act.

Undaria was declared an unwanted organism to assist in the management of an undaria infested fishing vessel that foundered in the Chatham Islands. Undaria's unwanted organism status has subsequently been used on an adhoc basis to support limited or temporary regional initiatives. Its unwanted organism status is currently only used to limit commercial harvest to those situations outlined in the 2004 commercial harvest policy (see section 2.3.2).

In 2003 the Government considered a nationally led approach for undaria to protect selected value sites, however, this approach was not funded due to higher priorities in other biosecurity and environmental areas.

Undaria is identified as a pest in four regional pest management strategies¹ with only the Taranaki Regional Council currently actively managing it². Some general marine biosecurity initiatives may help reduce the spread of undaria to valued areas. For example, the Department of Conservation's programme for vessels travelling to the Sub-Antarctic Islands that requires all hulls to have been cleaned prior to departure, and MAFBNZ co-ordinated activities aimed at protecting the Fiordland Marine Area from marine risk organism impacts.

Q 1. Are there other undaria specific management programmes underway not referred to above? If yes, what, if any legislative tools are used to assist management?

2.3.2. Commercial regime

The current commercial regime allows undaria to be harvested in situations that contribute to the reduction of impact, control or eradication of undaria³. In line with this purpose, a policy was developed in 2004 that allows the commercial harvest of undaria in two situations:

- where it is taken as a by-product of another activity, for example, the clearing of mussel farming lines; or
- where it is taken as part of a control or eradication programme.

Under the 2004 policy, undaria is primarily managed under the Biosecurity Act, rather than the Fisheries Act 1996, as undaria's unwanted organism status means that a fishing permit under the Fisheries Act is not required.

¹ As at 16/12/08 undaria was in the Taranaki, Gisborne, Southland and Tasman/Nelson regional pest management strategies.

² The Taranaki Regional Council advised that they currently undertake surveys and hand removal of undaria on structures and the public wharf within the port area.

³ For a copy of the 2004 policy refer to: <http://www.biosecurity.govt.nz/files/biosec/policy-laws/undaria-harvest-policy.pdf>

There has been limited uptake of the 2004 policy with only one application approved. The current application is in the experimental phase of development. As a result of the limited uptake, neither the biosecurity nor commercial imperatives of the policy have been realised. The lack of uptake may be as a result of:

- the potential incompatibility of growth cycles between undaria and the primary products being harvested e.g. mussels;
- difficulties harvesting undaria outside of the harvesting cycles of the primary product; and/or
- the narrow scope of the 2004 policy that limits the control operators have over the quality and quantity of the harvested product.

Q 2. Are there any other hurdles that may have prevented the uptake of the 2004 policy? (e.g. lack of commercial opportunities; a lack of awareness of the policy's existence; or other).

2.4. POTENTIAL COMMERCIAL OPPORTUNITIES

Undaria is an edible brown seaweed that is primarily cultivated off the coasts of Japan, China and the Republic of Korea, with limited production in France. In its edible form it is commonly known as Wakame. Undaria is eaten fresh, blanch-salted or sundried and can be used for salads, fish and meat dishes as well as soups and accompaniments (Khan and Satam 2003).

In addition to human consumption as food, there is growing promotion of undaria in the health food and pharmaceutical markets. Antiviral compounds from undaria have been found to inhibit the Herpes simplex virus (Khan and Satam 2003). Other uses for undaria include fertiliser and fish food (e.g. paua food).

Estimates of the value of undaria vary due to the quality, origin of the product and end use. Aquaculture New Zealand estimates that undaria could return between NZ\$ 500/t for bulk seaweed for use in agricultural products through to greater than NZ\$ 1000/t for high grade undaria intended for premium grade food uses⁴. They estimate that in the Marlborough Sounds there is, on average, 5 tonnes of “naturally” occurring undaria per long-line and note that there are thousands of long-lines in the Marlborough Sounds. Aquaculture New Zealand is not concerned that undaria farming would increase the impact of undaria on their operations (i.e. mussel farming) as the industry is already having to contend with the problem now (Aquaculture NZ 2008).

In 1991 a United Nations Food and Agriculture Organisation (FAO) workshop was held on the cultivation and processing of undaria (United Nations 1991). The workshop identified Japan as both the major producer and consumer of undaria. Japan’s production of undaria is primarily from culture farms, although 5 percent of production is still derived from the collection from the wild.

The FAO workshop noted that Japanese consumers are very quality conscious and will demand that any imported product is of high quality. An assessment in 1993 by the New Zealand Trade Development Board (TRADENZ) determined that New Zealand undaria is similar to the lower priced Korean and Chinese product rather than the Japanese product. In

⁴ For food consumption, 100kg of fresh undaria decreases to 30kg once salted and reduces further 7kg if then dried. TRADENZ, Tokyo. 1993. Report on factors affecting the market for wakame in Japan.

addition, the TRADENZ report also noted that there is a perception issue in the market that nothing can compete to Japanese product, so even if the product from New Zealand was of equal quality it would not obtain the same price as Japanese Wakame (TRADENZ 1993).

Q 3. Do you agree with the estimate of the potential commercial value of undaria? If not, do you have information supporting a different valuation?

Q 4. How quality-sensitive are markets outside the human consumption market? Are there any specific requirements for these other markets e.g. frond size, growth rates or particular strains?

Q 5. Would undaria harvesting or farming have an effect on the commercial opportunities of other sectors?

2.5. POTENTIAL BIOSECURITY RISKS

Harvesting has the potential to increase the abundance of undaria in the local area as well as the rate at which undaria spreads in the local area and beyond. This can happen as disturbance during harvesting provides opportunities for undaria to reinfest an area. Harvesting can also dislodge reproductive material spreading undaria in the local area while infected harvesting equipment can spread undaria further afield.

Farming would increase the abundance of undaria in the local area as farming operations actively seed marine farming lines for on-growing. Farming could also potentially increase the rate at which undaria is spread in the locality of the farm and beyond as stock, equipment and vessels are moved around New Zealand to support the farming operation.

Q 6. Are there likely to be strong incentives to establish harvesting or farming operations outside areas infested with undaria?

2.6. THE ISSUE

Some stakeholders have indicated an interest in widening the type and scope of permissible commercial undaria activities allowed in New Zealand. This interest is due to the potential commercial uses of undaria including: human consumption (in the form of Wakame), health food, pharmaceuticals, fertiliser and fish food (e.g. paua food).

Undaria is an invasive species. MAFBNZ has assessed that undaria is likely to have a moderate impact on all values that marine biosecurity aims to protect. The most significant impacts are likely to be on environmental values, through among other things, reduction in species richness, changes to native habitats and reduction in species abundance. Moderate impacts on other values, such as economic activities, could include increased costs of harvesting farmed products, reductions in areas suitable for aquaculture, or increased costs of maintaining and cleaning vessels. Impacts may be more or less severe in different locations.

Despite limited active management of undaria to reduce its impacts, allowing greater commercial utilisation of undaria could potentially exacerbate its impacts by:

- increasing the rate at which undaria spreads around coastal New Zealand as a result of the movement of vessels and equipment associated with the commercial activities; and/or
- increasing the abundance of undaria in some localities as a result of harvesting and farming.

3. Objective of this Review

The objectives of this review are:

1. to assess the feasibility of allowing commercial harvest and/or farming of undaria while not significantly increasing its adverse impacts on existing or new sites; and
2. to determine the most efficient and effective legislative mechanisms to manage any undaria commercial regime that may be developed.

This document considers whether undaria's unwanted organism status, under the Biosecurity Act, is required to manage a commercial regime for undaria. Decisions on the scope and management regime for the commercial harvest of undaria will feed into a wider assessment on the need or otherwise to maintain undaria's unwanted organism status under the Biosecurity Act.

Q 7. Is undaria's unwanted status required for other purposes – e.g. linked to requirements within regional coastal plans/resource consents? If so, could these issues be managed under other regimes?

4. Options

MAFBNZ has identified three options for interested parties to consider. A table, summarising the options developed and considered in this document, is outlined below.

Table 1: Summary of possible options

	Options		
	1 (status quo)	2	3
Harvesting			
Only as part of control or by-product operations.	X		
Anywhere where it has naturalised, including natural substrates, artificial surfaces or floating and beach cast.		X	X
Farming			
Prohibited	X	X	
Only in coastal marine areas that are heavily infested with undaria			X
Active seeding of lines allowed			X
Stock for the farm can be sourced from anywhere in NZ			X

MAFBNZ's initial judgement is that it should be possible to allow greater commercial utilisation of undaria, than currently permitted by the status quo, without significantly increasing its adverse impacts. MAFBNZ considers that the regimes outlined in options 2 and 3 balance the biosecurity risks against the biosecurity and wider benefits by:

- not significantly increasing the biosecurity risk over and above that already occurring as a result of other farming and non-farming activities;
- continuing to allow commercial harvest as part of control and by-product operations, which could reduce the incidence and impact of undaria in localised areas; and
- providing for a level of take that could potentially allow the development of sustainable commercial opportunities.

MAFBNZ also considered and rejected the following three further options. The first option below was rejected outright while the other two were amalgamated into option 3 presented in this discussion document.

- All commercial undaria activity prohibited – this option was discarded as it simply prohibited the activity before determining the biosecurity risk.
- Harvesting allowed in any location where undaria has naturalised. Farms could only be established in heavily infested areas and only stocked with undaria from the vicinity of the farm e.g. a farm in Marlborough could not source undaria from Southland – this option was discarded as it would potentially have been very difficult to enforce the requirement for locally sourced stock.
- Harvesting and farming in any location allowed – this option was discarded as it would potentially exacerbate the impact of undaria by allowing farming in any location regardless of whether currently infested or not.

Q 8. Are there any additional options that should have been considered as part of this analysis?

4.1 OPTION 1: HARVEST AS PART OF CONTROL OR BY-PRODUCT OPERATIONS ONLY (STATUS QUO)

4.1.1. Description

This option:

- allows harvesting only when being taken as part of an undaria control programme or as a by-product of another commercial activity; and
- prohibits farming.

For a copy of the current harvest policy see: www.biosecurity.govt.nz/files/biosec/policy-laws/undaria-harvest.pdf

4.1.2. Commercial opportunities

The current regime was developed to allow commercial take while at the same time contributing to the reduction of impact, control or eradication of undaria. With only one application approved to commercially harvest undaria, neither the commercial or biosecurity imperatives of this regime have been realised.

This option is likely to provide operators with limited opportunities to access the valuable food markets due to constraints on the ability to control the quality of the harvested product. The food market is very quality sensitive. However, this option potentially allows operators to access other commercial markets such as the health food market, pharmaceutical use, fertiliser and fish food. These non food markets are potentially less quality sensitive.

4.1.3. Biosecurity risks and benefits

Compared to prohibiting all commercial harvest, this option is unlikely to increase abundance in an area as:

- the aim of any control programme is to maintain a harvesting schedule that reduces abundance in the area; and
- the nature of a by-product operation is that there is already going to be considerable disturbance in the area (e.g. clearing mussel lines) and as such harvesting undaria is unlikely to significantly increase the level of disturbance above this baseline.

The potential impact of local spread is also likely to be minimal because:

- operators undertaking control programmes are likely to be highly motivated to take all possible precautions to reduce the risk of accidental spread; and
- by-product operations are only likely to occur in areas where undaria is abundant and as such the impacts of increased spread, as a result of harvesting, may not be significant as they are already likely to be realised.

In terms of more wide-ranging spread, marine farming activities, vessel hull fouling and ballast water discharges have been identified as existing pathways for species transfers. This option is unlikely to significantly increase the level of existing traffic associated with undaria infested areas.

Q 9. Are there likely to be additional avenues for the activities, proposed under option 1, to spread undaria outside the locality of the harvesting area? If so, how? Are there any ways to mitigate these risks?

4.1.4. Management regime

To constrain commercial harvest to within the scope of this option requires undaria to remain an unwanted organism under the Biosecurity Act as this would allow biosecurity related requirements to be placed on the harvesting permits.

If undaria's unwanted status was revoked, the ability to place biosecurity related controls on harvest would be limited; harvest would primarily be managed via fishing permits under the Fisheries Act 1996⁵. Under the Fisheries Act, undaria would initially be managed as a non-quota species with the possibility that in future, provided it met certain criteria, it could be introduced to the Quota Management System⁶. Without its unwanted status, constraints on the commercial harvest of undaria are only likely to be feasible in areas where undaria is listed as a pest in a regional pest management strategy⁷.

Undaria's unwanted status would also ensure MAFBNZ is able to maintain a national "prohibition" on undaria farming. However, farming could be controlled regionally under the Resource Management Act 1991 (RMA) or regional pest management strategies regardless of whether undaria is an unwanted organism or not.

As an unwanted organism, any "permits" to commercially harvest undaria would need to be issued under sections 52 and 53 of the Biosecurity Act. Without a permit it would be unlawful to harvest (or farm) undaria under the Biosecurity Act. Appendix 3 outlines the requirements of section 52 and 53. To ensure good practice, MAFBNZ would consult with relevant regional councils, the Ministry of Fisheries, the Department of Conservation and any affected parties prior to issuing any permits.

As part of the process, MAFBNZ would provide the applicant with the opportunity to comment on the draft decision, including the supporting analysis, and provide additional information in support of the application. MAFBNZ would then finalise the decision and communicate that decision to the applicant.

Authorisation under the Biosecurity Act does not remove the requirement to obtain permission under other legislation where required. For example, a special permit under the Fisheries Act 1996 would be required if the method or area of undaria harvesting would contravene requirements under that Act. Under the RMA, no person may disturb any foreshore or seabed [...] in a manner that has or is likely to have an adverse effect on the foreshore or seabed (other than for the purpose of lawfully harvesting any plant or animal) unless authorised to do so. Authority could take the form of a rule in a regional coastal plan and in any relevant proposed regional coastal plan or a resource consent.

Q 10. To ensure the integrity of option 1, management would need to be consistent throughout New Zealand. Is it necessary to maintain undaria's unwanted status to ensure national consistency? If not, why? What other option is preferred?

⁵ The Ministry of Fisheries can place conditions on fishing permits, however, they would be limited in the extent they can place biosecurity conditions as any conditions would need to fall within the scope of the purpose of the Fisheries Act 'to provide for the utilisation of fisheries resources while ensuring sustainability'

⁶ The Quota Management System limits the total quantity of fish taken by commercial fishers under the Fisheries Act.

⁷ Decisions have previously been made not to develop a national pest management strategy for undaria

4.2. OPTION 2: HARVEST UNDARIA ANYWHERE IT HAS NATURALISED, BUT EXCLUDES FARMING

4.2.1. Description

This option:

- allows harvesting anywhere where undaria has been naturalised, including natural substrates, artificial surfaces, floating or beach cast; and
- prohibits farming.

4.2.2. Commercial opportunities

This option is likely to provide operators with limited opportunities to access the valuable food markets due to limited control over the quality of the harvested product. However, access to other commercial markets is likely to be greater than the status quo (option 1) as operators can collect larger quantities of undaria. Under this option operators are not limited to collecting undaria as part of a control programme or as a by-product of another activity. These non-food markets are potentially less quality sensitive.

4.2.3. Biosecurity risks and benefits

Under this option, the potential impact of increased abundance and spread in the local area is likely to be minimal as harvesting would only be likely to occur in areas where undaria is abundant. Harvesting would primarily be focused in areas where undaria is abundant due to the logistics of harvesting and the ratio between the quantity harvested and end product produced (see footnote 4). In areas where undaria is abundant the impacts are already being realised. In addition, some operations, such as control programmes, are likely to decrease the abundance of undaria in an area.

In terms of more wide ranging spread, an increase in local abundance of undaria may increase the rate of uptake by vectors⁸, such as recreational vessels. The resulting impact of any increased uptake and transfer may not be significant. These vectors would have previously been exposed to, and transferred, undaria as harvesting is likely to occur in areas already heavily infested with undaria. Existing or new activities that promote the use of well maintained vessels and the cleaning of equipment before moving between sites would help reduce the likelihood of transfer. Maintenance or cleaning activities would need to occur in accordance with requirements in relevant regional coastal plans.

The rate of uptake of undaria by a vector is an interplay of, among other things, the abundance of propagules⁹ and the susceptibility of the vector to colonisation, e.g. the effectiveness of the antifouling paint. Floerl and Inglis (2005) identified that a vector's susceptibility to colonisation (i.e. age of antifouling paint) was a good predictor of probability of an organism being transported. Increasing density of undaria does not necessarily increase the amount of propagules released. Research on macro algae has shown that as stands of algae increase in density the reproductive output per plant decreases (Reed 1990).

⁸ A vector is any agent or mechanism that can assist undaria being transferred from one area of New Zealand to another e.g. marine farming and fishing equipment, vessels, marine farming stock.

⁹ Propagule – any plant material used for the purpose of plant propagation.

4.2.4. Management regime

To constrain commercial harvest to within the scope of this option, it would be preferable that undaria remain an unwanted organism under the Biosecurity Act. The unwanted status provisions are desirable to ensure that a national prohibition on farming is maintained.

As an unwanted organism, any “permits” to commercially harvest undaria would need to be issued under sections 52 and 53 of the Biosecurity Act. The permit regime would not need to be as prescriptive as for option 1. Under option 2 there would be no need to determine whether the activity is being undertaken as part of a control or by-product operation and could simply include standardised information on how to reduce the biosecurity risk during harvesting.

Providing harvesters with standardised information on how to harvest undaria “safely” would be preferable to an outcome based approach where harvesters determine how to reduce the risk of their activity. Taking a standardised/prescriptive approach, at least initially, would be preferable as some operators may not have the resources to identify and develop appropriate methods. In addition, as this is a new type of activity, information may not be available on equivalent methods to reduce the risk. However, the system would need to be flexible enough to allow equivalent risk management methods, if identified, to be considered as part of the permit.

The minimal application requirements are likely to be the name and contact details of the applicant and the proposed harvesting location. The harvesting location would be important to ensure:

- that any Chief Technical Officer permission does not unintentionally contradict a rule within a regional pest management strategy; and
- that compliance effort can be targeted in areas where harvesting is likely to occur.

To ensure good process, MAFBNZ would consult with relevant regional councils, the Ministry of Fisheries, and the Department of Conservation to ensure that any Chief Technical Officer permission would not unintentionally contravene existing or proposed measures in the area. In addition, MAFBNZ would also make information publicly available.

Alternatively, this option could be managed outside the unwanted organisms provisions of the Biosecurity Act. Harvesters could simply be provided with guidelines on how to “safely” harvest undaria from the water. Under this alternative approach, regional councils could incorporate more stringent controls on harvesting through their regional pest management strategies where necessary or desired. In addition, to prohibit farming in accordance with the scope of this option, farming could be controlled under the RMA or regional pest management strategies regardless of whether undaria is an unwanted organism or not. However, with this approach, time would need to be allowed for regional pest management strategies to be updated to incorporate additional undaria specific controls, where necessary.

Q 11. Given that farming could potentially be prohibited under the RMA or a regional pest management strategy, is it necessary to have the additional powers of the unwanted organism provisions under the Biosecurity Act to support this option? If so, why?

Q 12. Do you think it is preferable to provide operators with standardised information with their permit on how to harvest undaria? If not, why?

Q 13. Given option 2 allows harvesting to occur anywhere undaria is naturalised, does the applicant need to provide additional information, other than name/contact details and location of harvest, with their application? If so, why?

Q 14. Should the areas where undaria can be harvested be prescribed? If so, under what regime?

4.3. OPTION 3: HARVEST UNDARIA ANYWHERE IT HAS NATURALISED, FARMING ONLY IN HEAVILY INFESTED AREAS

4.3.1. Description

This option:

- harvesting is allowed anywhere where it has been naturalised, including natural substrates, artificial surfaces or floating or beach cast; and
- farming:
 - farms can only occur in heavily infested areas; and
 - stock can be sourced from anywhere in New Zealand.

Q 15. In your view, what would be a good definition of “heavily infested areas” for the purposes of identifying potential sites to allow undaria farming? How easily would it be to obtain information to assess whether an area meets the “heavily infested area” definition?

4.3.2. Commercial opportunities

This option is likely to provide operators with the greatest opportunities to access both the valuable food market and other commercial markets. Operators would have more control over both the quantity and quality of undaria grown on their farm. Under this option, farmers could potentially move desirable strains of undaria in from other parts of New Zealand onto their farm and are likely to use land based facilities to seed aquaculture ropes for the high value products.

It is important to note that the most desirable strains may not be present in New Zealand¹⁰. This option does not propose facilitating the introduction of new undaria strains into New Zealand. Currently no import health standard (IHS) allows the introduction of viable undaria into New Zealand. The risk assessment for any future IHS considering the introduction of viable undaria would consider the risks posed by the undaria as well as associated pests and diseases.

Q 16. Are there biosecurity risks associated with allowing land-based seeding of aquaculture ropes? If so, are there any potential mitigation options?

4.3.3. Biosecurity risks and benefits

The issues relating to the harvesting of undaria in “naturalised” areas are the same for this option as they are for option 2, that is, harvesting would only be likely to occur in heavily infested areas where the impacts are already likely to be realised. Only the additional issues relating to the farming component of this option are discussed below.

The farming component of this option would increase the abundance and spread of undaria in the locality of the farm. Under this option, a farm can on-grow undaria from the local area or

¹⁰ At a 1991 Food Agriculture Organisation (United Nations) workshop on culture and processing of *Undaria*, major producers of commercial *Undaria* (Japan, Korea and China) highlighted the need to identify/develop new *Undaria* strains to improve the production and quality of *Undaria*. (www.fao.org/docrep/field/003/AB733E/AB733E00.HTM)

from other locations in New Zealand. Where the farm uses “local” undaria the **additional** impact of the farming operation, relative to the current situation, is unlikely to be significant. Farming would only be allowed in areas heavily infested with undaria where the impacts are already likely to be being realised.

Where farms use undaria from other locations around New Zealand, there may be some additional impacts in the local area. Anecdotal evidence suggests that the different strains found around New Zealand have quite different characteristics in terms of plant size and growing season (Hunt 2009). However, any **additional** impacts as a result of the farming activity may be minimal as different strains of undaria can already be inadvertently moved around New Zealand via:

- existing marine farming activities in association with the movement of spat and equipment (McClary 2004);
- fouling on recreational and commercial vessels (Stuart 2003); or
- ballast water in commercial vessels – annually there are on average 7000 large vessel merchant movements between New Zealand ports annually (NIWA 2008).

In addition, the fast growing larger strains of undaria may not necessarily be the most desirable. For example, a 1991 United Nations Food Agriculture Organisation workshop on culture and processing of undaria noted the commercial viability of strains with faster growth rates had not been tested and that the Japanese consumers are unlikely to accept anything other than traditional products they are used to (United Nations 1991).

Q 17. Is there any information on the characteristics of undaria strains used for the more lucrative undaria markets?

Q 18. Is there any evidence of different strains of undaria having different impacts on the marine environment?

In terms of wide-ranging spread, farming and non-farming vectors could potentially spread undaria beyond the locality of the farm. The movement of undaria farming equipment, stock or supporting vessels may not significantly increase the risk of spread as:

- this option only allows undaria farming to occur in heavily infested areas.
- undaria is already in the five main marine farming areas¹¹ and as a result the majority of movements are likely to occur between undaria infested areas (McClary 2004);
- the movement of equipment and stock already occurs between these marine farming areas to support other types of marine farming operations.

The most significant threat associated with farming equipment and farm support vessels would be when they are moved between undaria and non-undaria farms, as these latter farms could be located in undaria-free areas. In some cases, other vectors may regularly move between these undaria infested and uninfested areas. It may be possible to impose conditions on any permits to decrease this risk, for example, that aquaculture ropes /equipment used for undaria farming cannot be used to establish farms in areas without undaria.

The increased abundance of undaria associated with the farm may increase uptake by non-farming vectors. The significance of increased uptake or spread is unknown as these vectors are likely to have previously been exposed to undaria, as farming is only allowed to occur in areas already heavily infested with undaria.

¹¹ Firth of Thames, Marlborough Sounds, Golden Bay/Tasman, Banks Peninsula and Southland (Bluff and Stewart Island)

Q 19. Is there likely to be a significant amount of sharing of gear/vessels between undaria and non-undaria farms, if so, what type of gear/vessels and how frequently is it likely to occur?

Q 20. Is it practical to place controls on the specific gear/vessels used to establish and support a particular farming operation? If so, are there examples where this has occurred for other types of marine farms?

4.3.4. Management regime

This option could be managed with or without the use of the unwanted organism provisions of the Biosecurity Act. The nature of the management regime would therefore depend on whether or not undaria remains an unwanted organism. These two scenarios are set out below.

Undaria remains unwanted

If undaria remained an unwanted organism, harvesting could be managed via a permit regime under the Biosecurity Act as outlined in option 2.

In terms of farming, Biosecurity Act and RMA approval would be required. Biosecurity Act approval would be required to allow activities otherwise prohibited under sections 52 and 53 of that Act. A consent under the RMA would be required to allow a farm to be established within the coastal marine area.

Under this scenario, it would be preferable that the Biosecurity Act approval for a farming operation is subsequent to any RMA consent process. The majority of impacts of a farm, including the biosecurity impacts, are likely to be considered as part of the resource consent process. The resource consent process would need to take into consideration any constraints/requirements outlined in relevant regional pest management strategies, as well as regional coastal plans and national coastal policy statements¹². MAFBNZ would engage in any resource consent proposals seeking to farm undaria. If the resource consent was granted, MAFBNZ would then make its decision, under the Biosecurity Act, based on its undaria policy.

If undaria is also a pest in a region, permission under the Biosecurity Act would be required if that activity would otherwise contravene the relevant regional pest management strategy.

Where permission is required there are three possible options:

- a Chief Technical Officer could provide permission under section 52 of the Biosecurity Act;
- a Chief Technical Officer could delegate the power to provide permits to an employee of the regional council; or
- a regional council could issue an exemption under s80D of the Act (this depends on the wording of the regional pest management strategy).

Undaria's unwanted organism status is removed

If undaria's unwanted status was removed, management would primarily fall under the Fisheries Act for harvest and the RMA for farming.

¹² A revised New Zealand coastal policy statement (Statement) is due for release in the near future. Any implications of the revised Statement on the undaria commercial harvest policy will be taken into consideration when finalising the commercial policy.

If undaria's unwanted status was removed **harvesting** would be authorised by a fishing permit under the Fisheries Act.

- The Ministry of Fisheries would have limited authority to place biosecurity conditions on any fishing permits as conditions would need to fall within the scope of the purpose of the Fisheries Act¹³.
- No exemptions would be required to harvest under the Biosecurity Act unless it was a pest in the region. If a pest in a region, Chief Technical Officer or regional council approval would be required¹⁴.
- No consent would be required to harvest under the RMA as long as the harvesting activity was in accordance with the Fisheries Act requirements.
- Harvesting could be managed via guidelines issued to operators on how to "safely" harvest undaria from the water with regional councils incorporating more stringent controls in their regional pest management strategies where necessary or desired.

If undaria's unwanted status was removed **farming** could be authorised under the RMA. Controls on farming could be managed through the RMA planning process that assesses applications for aquaculture farms within the coastal marine area.

- No exemptions would be required to farm undaria under the Biosecurity Act unless it was a pest in the region. If a pest in a region, Chief Technical Officer or regional council approval would be required¹⁵.
- Development of undaria farming would require consideration of the controls/requirements outlined in the Regional Pest Management Strategy, as well as regional coastal plans and national coastal policy statements.

Maintaining undaria as an unwanted organism, while at the same time allowing extensive harvesting and limited farming, may result in a duplication of effort for both the authorising agencies and the applicant. This duplication could also confuse the end user as to their legal obligations. Examples of potential areas where duplication could occur are outlined below:

- MAFBNZ would need to develop a harvesting regime for undaria when a regime already exists under the Fisheries Act to harvest aquatic organisms; and
- applicants would need to seek both RMA and Biosecurity Act approval to farm undaria – although this latter approval may not be onerous if biosecurity issues are considered as part of the RMA process.

Q 21. Do you have a preference for whether option 3 should be managed with or without the unwanted organism provisions of the Biosecurity Act, if so, why?

Q 22. If undaria remains unwanted, is it preferable to have the farming resource consent process considered prior to the Biosecurity Act considerations, if not, why not?

Q 23. Are there any other risks not identified here in regards to the farming of undaria?

¹³ The purpose of the Fisheries Act is to "to provide for the utilisation of fisheries resources while ensuring sustainability"

¹⁴ Where *Undaria* is a pest in a region, but not an unwanted organism, permission under the Biosecurity Act is still required to harvest or farm *Undaria* if that activity would otherwise contravene the relevant Regional Pest Management Strategy. Where permission is required there are three possible options:

- a Chief Technical Officer could provide permission under section 52 of the Biosecurity Act;
- a Chief Technical Officer could delegate the power to provide permits to an employee of the regional council; or
- a regional council could issue an exemption under s80D of the Act (this depends on the wording of the regional pest management strategy)

¹⁵ Same as footnote 15.

5. Notes for Submitters

We welcome submissions from all interested parties on any aspect of the analysis and proposed options presented in this document.

Submissions are public information and may be subject to requests under the Official Information Act 1982. If you consider that any or all of the information in your submission should be treated as confidential or commercially sensitive please state this clearly in your submission. Any decision to withhold information under the Official Information Act may be reviewed by the Ombudsman.

5.1. MAFBNZ SEEKS YOUR COMMENT

The key issues that MAFBNZ seeks your comment on are:

- What hurdles have prevented the uptake of the 2004 commercial harvest policy?
- How valuable are the opportunities around the commercial harvest of undaria? Are New Zealand producers likely to be able to take advantage of these opportunities?
- Is commercial harvest likely to significantly exacerbate the spread and impact of undaria over and above that already occurring as a result of other activities? If so, how?
- What is the most efficient and effective legislative mechanism to manage any commercial take, that is, the Biosecurity Act, RMA, the Fisheries Act or a combination of these statutes?
- What is the preferred option for managing the commercial harvest of undaria?

To help submitters address the issues above and facilitate feedback, questions have been included throughout the document, however, comment is welcome on any aspect of the analysis and proposed options presented. The questions included throughout this document are collated, for ease of reference, in Appendix 1.

5.2. REQUIREMENTS FOR SUBMISSIONS

Submitters are asked to include the following information in their submissions:

- the title of this discussion paper;
- your name and title;
- your organisation's name (if applicable);
- your address and contact details (e.g. phone, fax and email); and
- the number(s) of the section/question you are commenting on.

5.3. CLOSING DATE FOR SUBMISSIONS

All submissions must be received by MAF Biosecurity New Zealand no later than **5pm on 31 July 2009**. Please address submissions to:

Maria Cassidy
Policy and Risk
MAF Biosecurity New Zealand
P O Box 2526
WELLINGTON 6140

E-mail: maria.cassidy@maf.govt.nz
Facsimile: (04) 894 0730

5.4 PROCESS FOLLOWING RECEIPT OF SUBMISSIONS

The next stage in the review will be to analyse all submissions and prepare a final proposal for the Minister for Biosecurity. A summary of submissions and final decisions on the policy will be made publicly available.

6. References

- Aquaculture New Zealand. 2008. *Aquaculture New Zealand response to Biosecurity New Zealand request for information in regard to review of regulatory management of undaria farming and harvesting in New Zealand*. Report submitted to MAF Biosecurity New Zealand Dec 2008.
- Floerl O. and Inglis G. J. 2005. Starting the invasion pathway: the interaction between source populations and human transport vectors. *Biological Invasions*: 7: 589-606.
- Hunt L., Chadderton L., Stuart M., Cooper S. and Carruthers M. 2009. *Results of an attempt to control and eradicate Undaria pinnatifida in Southland New Zealand: April 1997 – November 2004*. Department of Conservation publication.
- Khan S. I and Satam S. B. 2003. Seaweed Mariculture: Scope and Potential in India. *Aquaculture Asia*. Vol VIII (4). (<http://library.enaca.org/AquacultureAsia/Articles/Oct-Dec-2003/7seaweedindia.pdf>).
- McClary D. 2004. ZBS 2001/02 – KMA – *Investigation of vector management techniques to reduce the spread of Undaria pinnatifida around New Zealand*. Objective 4, Final Research Report. Report submitted to MAF Biosecurity New Zealand.
- NIWA 2008. *DRAFT REPORT Vessel Movements within New Zealand: Evaluation of vessel movements from the 24 ports and marinas surveyed through the port baseline survey programmes*, ZBS2000-04 and ZBS2005-19 (ZBS2005-13). Draft report submitted to MAF Biosecurity New Zealand.
- Reed Daniel C. 1990. An experimental evaluation of density dependence in a subtidal algal polulation. *Ecology* 71(6): 2286-2296.
- Russell L. K., Hepburn C. D., Hurd C. L., and Stuart M. D. 2008. The expanding range of *Undaria pinnatifida* in southern New Zealand: distribution, dispersal mechanisms and the invasion of wave-exposed environments. *Biological Invasions*.10:103-115.
- Stuart M. D. 2003. Appendix 5 – Regional Vector Traffic and MPAs. In: ZBS 2001/02 – KMA – *Investigation of vector management techniques to reduce the spread of Undaria pinnatifida around New Zealand*. Objective 4, Final Research Report APPENDICES (ed McClary, D. J and Stuart, M. D. 2004). Report submitted to MAF Biosecurity New Zealand.
- TRADENZ, Tokyo. 1993. *Report on factors affecting the market for wakame in Japan*.
- United Nations Food and Agriculture Organisation. 1991. *Workshop on the cultivation and processing of undaria*. (www.fao.org/docrep/field/003/AB733E/AB733E00.HTM)
- Uwai S., Nelson W., Neill K., Wang W. D., Aguilar-Rosas, L. E., Boo, S. M., Kitayama T. and Kawai, H. 2006. Genetic diversity in *Undaria pinnatifida* (Laminariales, Phaeophyceae) deduced from mitochondria genes – origins and succession of introduced populations. *Phycologia*. 45(6):687-695.

Appendices

APPENDIX 1: QUESTIONS POSED THROUGHOUT DOCUMENT

Q 1. Are there other undaria specific management programmes underway not referred to above? If yes, what, if any legislative tools are used to assist management?

Q 2. Are there any other hurdles that may have prevented the uptake of the 2004 policy? (e.g. lack of commercial opportunities; a lack of awareness of the policy's existence; or other).

Q 3. Do you agree with the estimate of the potential commercial value of undaria? If not, do you have information supporting a different valuation?

Q 4. How quality-sensitive are markets outside the human consumption market? Are there any specific requirements for these other markets e.g. frond size, growth rates or particular strains?

Q 5. Could undaria harvesting or farming have an effect on the commercial opportunities of other sectors?

Q 6. Are there likely to be strong incentives to establish harvesting or farming operations outside areas infested with undaria?

Q 7. Is undaria's unwanted status required for other purposes – e.g. linked to requirements within regional coastal plans/resource consents? If so, could these issues be managed under other regimes?

Q 8. Are there any additional options that should have been considered as part of this analysis?

Q 9. Are there likely to be additional avenues for the activities, proposed under option 1, to spread undaria outside the locality of the harvesting area? If so, how? Are there any ways to mitigate these risks?

Q 10. To ensure the integrity of option 1, management would need to be consistent throughout New Zealand. Is it necessary to maintain undaria's unwanted status to ensure national consistency? If not, why? What other option is preferred?

Q 11. Given that farming could potentially be prohibited under the RMA or a regional pest management strategy, is it necessary to have the additional powers of the unwanted organism provisions under the Biosecurity Act to support this option? If so, why?

Q 12. Do you think it is preferable to provide operators with standardised information with their permit on how to harvest undaria? If not, why?

Q 13. Given option 2 allows harvesting to occur anywhere undaria is naturalised, does the applicant need to provide additional information, other than name/contact details and location of harvest, with their application? If so, why?

Q 14. Should the areas where undaria can be harvested be prescribed? If so, under what regime?

Q 15. In your view, what would be a good definition of “heavily infested areas” for the purposes of identifying potential sites to allow undaria farming? How easily would it be to obtain information to assess whether an area meets your definition of a ‘heavily infested area’?

Q 16. Are there biosecurity risks associated with allowing land-based seeding of aquaculture ropes? If so, are there any potential mitigation options?

Q 17. Is there any information on the characteristics of undaria strains used for the more lucrative undaria markets?

Q 18. Is there any evidence of different strains of undaria having different impacts on the marine environment?

Q 19. Is there likely to be a significant amount of sharing of gear/vessels between undaria and non-undaria farms, if so, what type of gear/vessels and how frequently is it likely to occur?

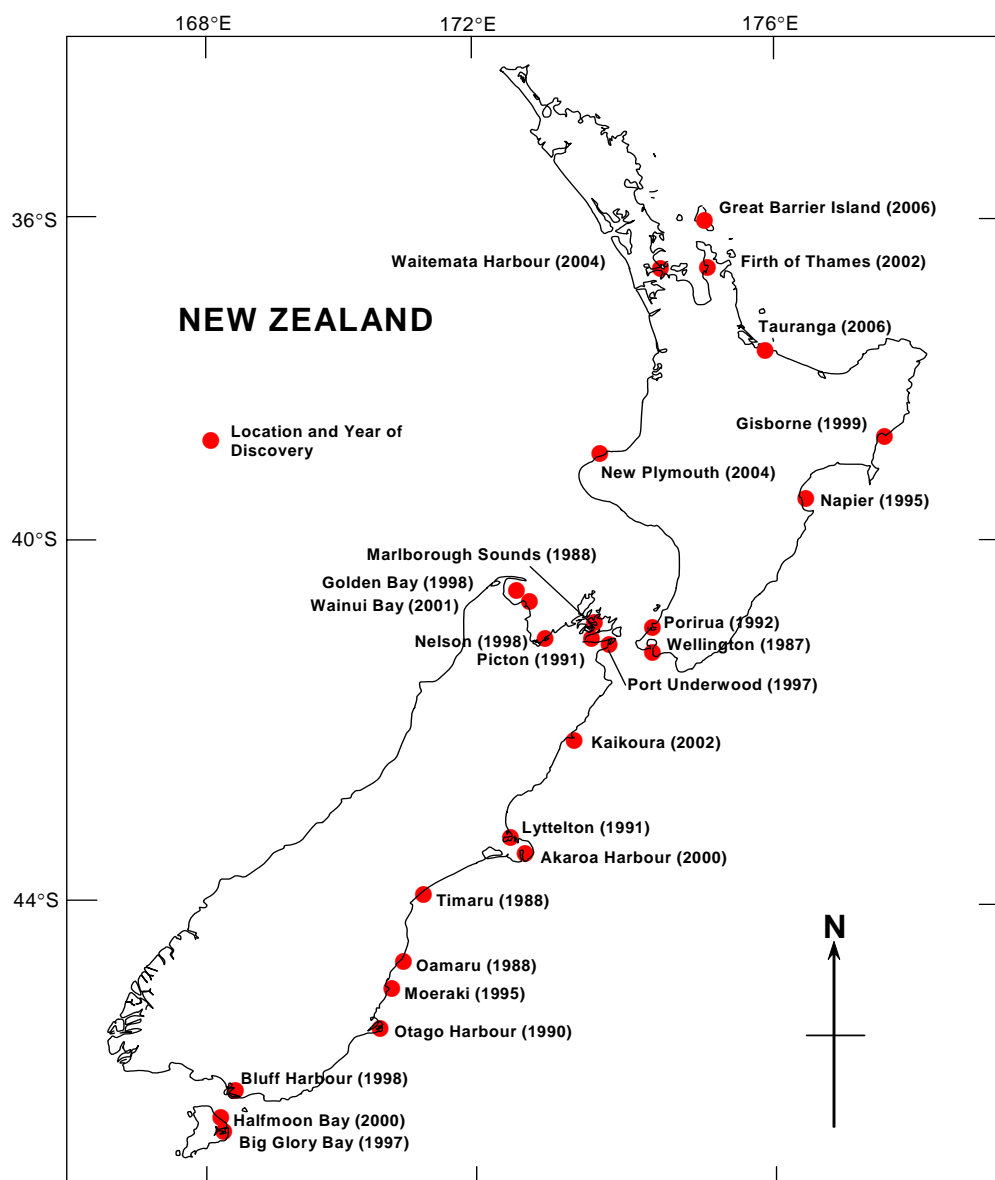
Q 20. Is it practical to place controls on the specific gear /vessels used to established and support a particular farming operation? If so, are there examples where this has occurred for other types of marine farms?

Q 21. Do you have a preference for whether option 3 should be managed with or without the unwanted organism provisions of the Biosecurity Act, if so, why?

Q 22. If undaria remains unwanted, is it preferable to have the farming resource consent process considered prior to the Biosecurity Act considerations, if not, why not?

Q 23. Are there any other risks not identified here in regards to the farming of undaria?

APPENDIX 2: CURRENT KNOWN DISTRIBUTION OF UNDARIA



APPENDIX 3: SECTIONS 52 AND 53 OF THE BIOSECURITY ACT 1993

52 Communication of pest or unwanted organism

No person shall knowingly communicate, cause to be communicated, release, or cause to be released, or otherwise spread any pest or unwanted organism except—

- (a) In the course of and in accordance with a pest management strategy; or
- (b) As provided in an emergency regulation made under section 150 of this Act; or
- (c) For a scientific purpose carried out with the authority of the Minister.
- (d) As permitted either generally or specifically by a chief technical officer.

53 Duties of owners of organisms

(1) Subject to subsection (2), the owner or person in charge of an organism which that person knows or suspects constitutes, contains, or harbours a pest or unwanted organism must not—

- (a) Cause or permit that organism to be in a place where organisms are offered for sale or are exhibited; or
 - (b) Sell or offer that organism for sale; or
 - (c) Propagate, breed, or multiply the pest or unwanted organism or otherwise act in such a manner as is likely to encourage or cause the propagation, breeding, or multiplication of the pest or unwanted organism.
- (2) A chief technical officer may permit an owner or person in charge of an organism to carry out an act otherwise prohibited by this section.
- (3) Permission given under this section must be given either by notice in the Gazette or in writing to the owner or person in charge of an organism.

The Biosecurity Act 1993 can be found online at: www.legislation.govt.nz