

The New Zealand King Salmon Limited

**Ngamahau, Richmond and Waitata
Marine Farms**

Wildlife Nuisance Management Plan

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1 Introduction

New Zealand King Salmon (NZKS) currently has five salmon farms (eight sites) in the Marlborough Sounds; located at Ruakaka Bay, Forsyth Bay, Waihinau Bay, Otanerau Bay, Te Pangu Bay, Clay Point, and two farms at Crail Bay. Resource consents for three new farms have recently been granted and the following farms will be established in due course: Waitata, Richmond and Ngamahau ([Figure 1](#)).

During the recent Board of Inquiry process a number of concerns were raised regarding the attraction of nuisance wildlife to the salmon farms and surrounding areas; and the associated adverse effects that these wildlife may have on local amenity values. NZKS recognises that the Coastal Marine Area of the Marlborough Sounds is a shared resource with exceptionally high amenity and recreation value. For this reason, NZKS has worked with neighbouring property owners to identify their concerns in relation to nuisance wildlife, and to develop mitigation measures to address these.

1.1 Statutory requirements

As the resource consent holder NZKS has overall responsibility for ensuring that all resource consent conditions are complied with. For all three new farms, the resource consent condition relating to nuisance wildlife is identical; hence, this management plan is directly relevant to all farms currently under establishment. This management plan will also be a useful guide to nuisance wildlife related issues at all existing farms as well.

The relevant consent condition for the three new farms states:

The consent holder shall develop a Wildlife Nuisance Management Plan and provide it to the Council prior to the initial placement of the first structure(s) at the marine farm

All NZKS operational activities must thereby comply with this Wildlife Nuisance Management Plan.

All appropriate New Zealand legislation shall also be complied with ([Section 2](#)).

1.2 Management plan objectives

The objective of this Wildlife Nuisance Management Plan is to minimise the risk of adjacent neighbours experiencing significant reductions in amenity values due to wildlife nuisances attributable to the marine farms.

In achieving this objective, which is specific to marine farm neighbours, potential wildlife nuisance issues on other marine users (i.e. tourism operators, recreational fishers, other recreational users etc.) are also addressed.

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Legend
 ● Existing NZ King Salmon Farms
 ■ Approved Farms

New Zealand King Salmon
 Approved Farm Site Map - Post Supreme Court Decision

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Figure 1: Locations of NZKS farms in the Marlborough Sounds

1.3 Potential wildlife nuisance concerns

A number of concerns relating to wildlife nuisance have been identified.

Of primary concern is the occurrence of predators (seals and sharks) in areas surrounding salmon farms. Predators naturally associate large aggregations of fish as a potential source of prey; therefore, it is not uncommon for predators to aggregate at salmon farms (Forrest *et al.* 2007).

From a social impact perspective, the attraction of predators has a number of potential adverse effects which are summarised below and discussed in greater detail in Sections 3 - 5:

- An increased presence of sharks and seals could confer a potential greater risk to the safety of recreational users in the marine farm vicinity; in particular swimmers, divers and kayakers¹;
- An increase in shark and seal numbers may reduce the local availability of wild fish populations for recreational fishers;
- An increase in seal numbers around the farms could lead to an increase in the number of shoreline haul out locations used by seals to rest. This shoreline presence can lead to reductions in amenity values for local residents and holiday home owners through the presence of the animals themselves, the presence of waste products (faeces and urine), and the associated unpleasant odours;
- Seals ashore also pose public health risks through the potential for seal bites and exposure to pathogens from live and dead animals and their waste products (faeces and urine).

Birds, particularly gulls, are also attracted to the marine farms as a potential location from which food can be opportunistically scavenged and as an area attractive for roosting during inclement weather. The attraction of birds has the following potential adverse effects:

- Large aggregations of gulls result in increased noise and what some perceive to be visual pollution;
- Birds roosting and defecating on property could reduce property value and cause building condition to deteriorate more rapidly. Other equipment may become fouled and unusable; and
- Increased concentrations of birds and faeces around the farms have the potential to pose some human health risks.

¹ Although salmon farms may encourage sharks to aggregate in the area, fish farms should not serve to increase the overall number of sharks (Clinton Duffy & Paul Taylor, hearing evidence)

2 General protocol

This section sets out all general protocols that relate to nuisance wildlife issues.

2.1 Compliance with the Marine Mammal Protection Act 1978

All marine mammals in New Zealand waters are fully protected under the Marine Mammals Protection Act 1978 (MMPA).

All interactions with marine mammals shall occur in accordance with the NZKS permit (issued by the Department of Conservation) to 'take' marine mammals under the MMPA and in accordance with the 'NZ King Salmon Marine Mammals and Shark Management Plan'. Any individual involved in any action in respect of this "take" permit is responsible for their own actions within the terms and conditions of the permit and the MMPA.

It is company policy for all staff to strictly follow the guidelines of the permit. Any deviation from the conditions of the permit, regardless of their alleged merits, will not be accepted as 'best practice' by the company and will be considered serious misconduct.

It is also company policy that "no action of wilful harm or the setting of wilful potential hurt towards seals is allowed"². Any contradiction of this principle may result in dismissal for serious misconduct.

2.2 Compliance with the Wildlife Act 1953

The Wildlife Act 1953 (the Wildlife Act) deals with the protection and control of wild animals within New Zealand.

All seabirds which could be construed as a nuisance at NZKS marine farms are protected by the Wildlife Act. It is illegal to kill or possess any bird or animal covered under the Wildlife Act unless a permit has been obtained, or in the case of black shags, little shags and pied shags, notification by the Minister has been given.

2.3 Compliance with resource consent conditions

The ongoing operations of NZKS are contingent on compliance with multiple resource consent conditions. The development of this Management Plan implements the resource consent conditions relating to wildlife nuisance.

2.4 Compliance with NZKS policy

It is company policy that all NZKS staff must comply with this Wildlife Nuisance Management Plan.

² NZKS Sea-pen Manual

3 Sharks

At least 14 species of shark are known to occur in the Marlborough Sounds (Table 1). Their presence in the Marlborough Sounds is highly seasonal and is thought to be related to the distribution of prey and reproductive behaviours. Observations of most large pelagic sharks in the region usually occur only during late spring and summer, although great white sharks are present year round in the Cook Strait area. A number of bronze whalers are recorded seasonally in the Pelorus Sound and spiny dogfish are typically recorded in large numbers during autumn and spring³. Sharks are generally not seen around the salmon farms in Queen Charlotte Sound and Tory Channel⁴.

Table 1: Shark species known to occur in the Marlborough Sounds

Common Name	Scientific Name	Risk posed
Great white**	<i>Carcharodon carcharias</i>	Potentially dangerous – risk of unprovoked attacks
Bronze whaler*	<i>Carcharhinus brachyurus</i>	Potentially dangerous – risk of unprovoked attacks
Basking*	<i>Cetorhinus maximus</i>	Traumatogenic – could attack if provoked
Common thresher	<i>Alopias vulpinus</i>	Traumatogenic – could attack if provoked
Carpet	<i>Cephaloscyllium isabella</i>	Harmless
School	<i>Galeorhinus galeus</i>	Traumatogenic – could attack if provoked
Mako	<i>Isurus oxyrinchus</i>	Potentially dangerous – risk of unprovoked attacks
Porbeagle	<i>Lamna nasus</i>	Potentially dangerous – risk of unprovoked attacks
Broadsnouted sevengill	<i>Notorhynchus cepedianus</i>	Potentially dangerous – risk of unprovoked attacks
Blue	<i>Prionace glauca</i>	Potentially dangerous – risk of unprovoked attacks
Smooth hammerhead	<i>Sphyrna zygaena</i>	Potentially dangerous – risk of unprovoked attacks
Rig/Spotted dogfish	<i>Mustelus lenticulatus</i>	Harmless
Spotted spiny dogfish	<i>Squalus acanthias</i>	Traumatogenic – could attack if provoked
Northern spiny dogfish	<i>Squalus griffini</i>	Traumatogenic – could attack if provoked

** fully protected species, * species protected from commercial fishing

³ Paul Taylor, hearing evidence

⁴ Mark Preece, hearing evidence

3.1 Potential for interaction

Members of the public, holiday home owners and local residents use the waters of the Marlborough Sounds for a variety of recreational activities such as diving, swimming, kayaking and fishing. A number of tourism operators also conduct such activities within the Marlborough Sounds.

Aggregations of sharks in the vicinity of salmon farms have the potential to increase human/shark interactions in these areas.

It is acknowledged that the salmon livestock may attract predators and that in the past NZKS employees occasionally fed sharks from NZKS farm structures, possibly increasing attraction to the area. This practice ceased in 2008.

3.2 Mitigation Measures

The following mitigation measures have been put in place to reduce the likelihood of sharks being attracted to NZKS farms and the wider area;

- Appropriate predator exclusion nets made of predator resistant material and maintained appropriately surround all salmon pens;
- The use of predator exclusion nets will reduce the likelihood of sharks from entering NZKS farms and gaining access to livestock, thereby dissuading animals from associating the farm with an 'easy feed';
- Staff are not permitted to feed sharks from the workplace;
- Staff are not permitted to fish for sharks from the workplace; and
- Dead fish must be removed as soon as reasonably practical from the net pens.

With these mitigation measures in place the risk of a shark attack around the farms is thought to be no greater than the risk of shark attack elsewhere in the marine environment.

Further information on shark management can be found in the 'NZ King Salmon Marine Mammal and Shark Management Plan'.

4 Marine mammals

The New Zealand fur seal (*Arctophoca australis forsteri*) (hereafter referred to as 'seals') is the only marine mammal species considered to be a potential nuisance for other users in the vicinity of NZKS salmon farms.

Seals are relatively abundant in the Marlborough Sounds and are expanding in their geographic range. Seal presence varies but higher numbers are generally experienced in winter. Seals forage at sea and return to land where they come ashore (haul out) to rest and breed.

4.1 Potential for interaction

In addition to the natural foreshore, fur seals are often observed hauled out on manmade structures in the marine environment (Figure 2). While hauled out ashore, seals and their waste products (faeces and urine) are associated with unpleasant odours and visual pollution.

Seals ashore also pose public health risks through the potential for seal bites and exposure to pathogens from live and dead animals and their faeces. Some pathogens of marine mammals can transfer disease to humans (and potentially domestic animals; Cooke *et al.* 1999).

Seals are known to carry the following zoonotic pathogens: tuberculosis (*Mycobacterium spp.*) (Hunter *et al.* 1998), salmonella (Duignan, 2003), campylobacter (Duignan, 2003), leptospirosis (Mackereth *et al.* 2005) and seal finger⁵ (*Mycoplasma spp.*) (Cawthorn, 1994). Those persons directly handling seals are considered to be at the greatest risk of exposure as tuberculosis, campylobacter and seal finger; as pathogens are present in infected organs of dead and live fur seals and are typically not shed into the surrounding environment. Salmonella and leptospirosis, however, can be present in fur seal faeces and urine so contact with these pathogens is less specific and more widespread. Good personal hygiene must be practiced by those who come into contact with seal waste products to prevent infection. In defence of fur seals, it should be noted that salmonella infection among marine mammals is linked to contamination of their environment by human sewage (Duignan, 2003).

4.2 Mitigation Measures

The following mitigation measures have been put in place to reduce the likelihood of fur seals being attracted to NZKS farms, and to reduce associated adverse interactions:

- Appropriate predator exclusion nets made of predator resistant material and maintained appropriately surround all salmon pens (Figure 3);
- The use of predator exclusion nets reduces the likelihood of seals from entering NZKS farms and gaining access to livestock and structures, thereby dissuading animals from associating the farm with an 'easy feed' or a haul out location;
- No feeding of marine mammals is permitted at NZKS farms;
- Dead fish must be removed as soon as reasonably practical from the fish pens;
- Only trained staff are permitted to handle seals; and
- Good hygiene is imperative for those persons who come into direct contact with marine mammals or their waste products.

Refer to the Marine Mammal and Shark Management Plan for detailed information on predator exclusion nets and further marine mammal management.

⁵ A bacterial infection commonly contracted by those who historically hunted seals



Figure 2: A NZ fur seal hauling out onto a NZKS farm structure



Figure 3: An example of predator exclusion netting at a NZKS farm structure

5 Birds

All NZKS farms have issues with birds. These include:

- Gulls and passerines (e.g. sparrows and starlings) scavenging for fish-feed at the marine farms;
- Gulls scavenging for mortalities at the marine farms;
- Birds, predominantly gulls using the farms as a roosting site during times of inclement weather in other areas such as Cook Strait; and
- Birds defecating in the water and on marine farm infrastructure and on neighbouring properties.

Bird species which frequent NZKS farms are summarised in [Table 2](#).

Table 2: Bird species which frequent NZKS farms

Common Name	Scientific Name	Foraging strategy
Little pied shag	<i>Phalacrocorax melanoleucos brevirostris</i>	Predatory
Black shag	<i>Phalacrocorax carbo</i>	Predatory
Pied shag	<i>Phalacrocorax varius varius</i>	Predatory
Little black shag	<i>Phalacrocorax sulcirostris</i>	Predatory
New Zealand king shag	<i>Leucocarbo carunculatus</i>	Predatory
Spotted shag	<i>Stictocarbo punctatus</i>	Predatory
Australasian gannet	<i>Morus serrator</i>	Predatory
Southern black-backed gull	<i>Larus dominicanus dominicanus</i>	Scavenger
Red-billed gull	<i>Larus scopulinus</i>	Scavenger
Black-billed gull	<i>Larus bulleri</i>	Scavenger
House sparrow	<i>Passer domesticus domesticus</i>	Scavenger
Common starling	<i>Sturnus vulgaris vulgaris</i>	Scavenger

5.1 Potential for interaction

Birds attracted to the salmon farms aggregate around the farm and in the wider vicinity. Aggregations of birds create unpleasant odours (from their faeces) as well as visual and noise pollution. In extreme cases birds defecating on neighbouring property could reduce property value and cause buildings or equipment to deteriorate and become unusable.

Increased concentrations of birds and faeces around the farms have the potential to pose some human health risks. Birds carry a number of pathogens (bacterial, viral and fungal) that can be transferred to humans. The primary zoonotic risk from seabirds is via tick-borne diseases. Three tick species that are well known from New Zealand seabirds: *Ixodes uriae*, *Ixodes jacksoni* and *Carios capensis* (Heath 1987; Heath and Hardwicke 2011), having been recorded from Australasian gannets, red-billed gulls, spotted shags, little blue penguins and white-fronted terns (Austin 1978, 1984; Hoogstraal, 1967; Tompkins *et al.* 2013).

Although the potential exists for these ticks to cause health issues in humans (flaviviruses and an alphavirus) (Tompkins *et al.* 2013), no records of human-related

illness have been attributable to these species in NZ (Heath and Hardwicke 2011) and only those who directly handle seabirds are at risk of infection.

Passerine and gull species carry a range of diseases which are potentially transferable to humans. Salmonella is the most commonly contracted, and those who come into direct contact with infected birds or their faeces are most at risk. Salmonella typically presents as acute intestinal pain and diarrhoea and extra care to personal hygiene is warranted by those interacting with birds and their faeces. In New Zealand the majority of salmonella cases are related to foodborne transmission, however contact with bird faeces was the second largest risk factor (Wilson and Baker, 2009). No transmission through exposure to contaminated recreational water was documented (Wilson and Baker, 2009), although the possibility for this route of exposure certainly exists.

5.2 Mitigation Measures

Although the adverse effects of birds cannot be completely eliminated, the following mitigation measures are in place to prevent birds from entering NZKS farms and to deter birds from aggregating in the farms and surrounding areas:

- Covering all pens, raceways and ponds with netting to prevent access to pellets during feeding. Nets must be high enough above the water, and of sufficient tension, to prevent large numbers of birds from sitting on them and lowering them to a level where feed and fish can be eaten;
- Installing netting around rafters in utility sheds and out-buildings where applicable to prevent roosting;
- Covering all feed bins with secure lids;
- Sweeping-up spilt pellets from walkways, pontoons and floors; and
- Covering all mortality bins with secure lids.

6 Company Response

In the event there is an identified effect on local amenity values through wildlife nuisance as a result of the salmon farm; the company will meet with those directly affected and discuss options to minimise the wildlife nuisance and if agreed assist where possible with that minimisation.

7 References

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