POTENTIAL EFFECTS ON BIRDS OF A PROPOSED NEW WHARF AND DREDGING PROJECT AT THE PORT OF NAPIER

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POTENTIAL EFFECTS ON BIRDS OF A PROPOSED NEW WHARF AND DREDGING PROJECT AT THE PORT OF NAPIER

Blue penguin observed and photographed by Napier Port staff.

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1. INTRODUCTION

Napier Port is proposing to construct a new wharf along the existing edge of the Northern Container Terminal. The new wharf will be approximately 34 metres wide and 350 metres long, and will provide additional berthage. The location of the wharf and an adjacent berth will be dredged to a depth of 14.5 metres prior to construction. Construction and dredging is likely to be completed over a period of approximately 18-24 months. Driving of some 380 piles will create the most noise during construction.

Further dredging will be undertaken to provide greater depth at the harbour entrance and swing basin through consecutive dredging campaigns, possibly lasting about four months each, and taking place over several years. A preliminary estimate of the total amount of dredged material is approximately 3.25 million cubic metres. The site for deposition of the dredged material is approximately four kilometres from Napier's Marine Parade, to the south and east of Pania Reef.

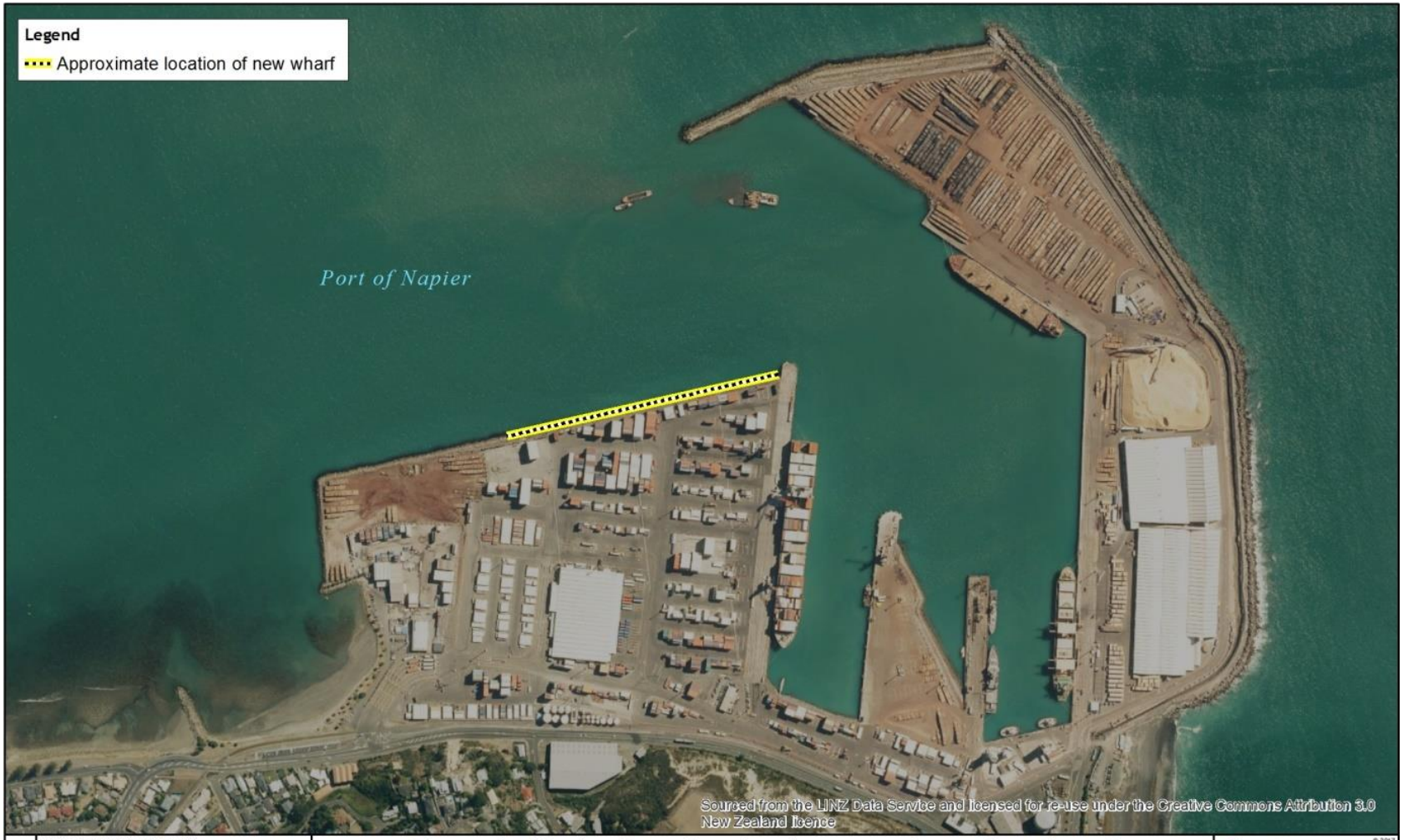
The works proposed have the potential to affect various species of shorebirds and seabirds. For example, northern blue penguin (*Eudyptula minor iredalei*; At Risk-Declining) are known to nest around the Port, and may breed in the revetment or riprap wall that will be dismantled as part of construction of the new wharf. Black-billed gull (*Larus bulleri*; Threatened-Nationally Critical) have recently bred on the point of a smaller wharf within the Port itself, which will not be modified by the proposal.

This report examines the potential for these and other species to be affected by the construction and dredging works, the likely levels of effects, and how these effects can be managed.

2. METHODS

A site visit to Napier Port was undertaken on 13 March 2017. Areas adjacent to the Port were also visited, including rock walls along Hardinge Road up to Perfume Point.

This assessment is based mostly on a desktop assessment that used published and unpublished literature, including observations held within the global eBird database of bird checklists at the Port and out to sea from Napier. Discussions with Department of Conservation staff in Napier and particularly the Department's penguin specialist Dave Houston (based in Auckland), were valuable in formulating potential mitigation actions for blue penguin.



Data Acknowledgment

Map contains data sourced from LINZ
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Figure 1. Napier Port showing the approximate location of the new wharf alongside the Northern Container Terminal

0 100 200 m

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Scale:	1:6,500
Date:	2/05/2017
Cartographer:	FM
Format:	A4R

3. POTENTIAL EFFECTS AND MITIGATION

Potential effects of construction of the new wharf and the dredging of a new access channel to the Port include:

- Mortality of northern blue penguin eggs, chicks, and/or adults from dismantling of the existing limestone revetment.
- Loss of penguin nesting habitat in the existing revetment, resulting from construction of the wharf.
- Disturbance of adjacent nesting and roosting birds, such as white-fronted terns, from construction of the wharf and dredging activities.
- Loss of roost sites in the existing revetment from construction of wharf.
- Disturbance of foraging birds by activities associated with construction of the wharf and dredging.
- Potential modification of foraging areas due to sedimentation from dredging activities, including offshore disposal of dredged material.

These potential effects are discussed in the sections that follow for the following species and groups of species:

- Northern blue penguin - korora.
- Black-billed gull - tarapunga.
- White-fronted tern - tara.
- Shag species.
- Foraging seabirds.

A separate section also addresses potential effects on birds utilising the Ahuriri Estuary.

4. NORTHERN BLUE PENGUIN - KORORA

4.1 National, regional, and local status

Korora/blue penguins are found in New Zealand and Australia[1]. In Australia, the species is generally referred to as a fairy penguin, while in New Zealand they are variously called little blue penguins, little penguins, or blue penguins. Common names, species names, and threat classifications used here are from Robertson *et al.* (2017).

[1] Recent genetic research has shown that the blue penguins found in Australia should be reclassified as a separate species from the New Zealand blue penguin, and also that a population of the Australian species is found in New Zealand along the Otago coastline. That is, New Zealand has two separate species of blue penguins (Grosser *et al.* 2015; Grosser *et al.* 2016). This analysis has been accepted by Robertson *et al.* (2017).

Blue penguin is the species most likely to be affected by the proposed construction of the wharf. Penguins are thought to nest in the existing limestone revetment that will be removed as part of construction. However, this has not yet been confirmed.

Blue penguins in Hawkes Bay are the northern blue penguin subspecies (*Eudyptula minor iredalei*). Taxonomy of the blue penguin species has been debated for decades. The Checklist of the Birds of New Zealand (Gill *et al.* 2010) describes the debate in detail, and does not recognise any subspecies. However, the National Threat Classification system presently recognises four subspecies: northern blue penguin, southern blue penguin (*E. m. minor*), white-flippered blue penguin (*E. m. albosignata*), and Chatham Island blue penguin (*E. m. chathamensis*).

The northern subspecies is classified as At Risk-Declining as it is thought to have a large but declining population. The draft report on the Regional Status of Birds of Hawkes Bay (2014) estimates the regional population to number between 1,000-5,000 birds, most of which occur in three sites: Napier Port, Cape Kidnappers, and Motu-o-kura (Bare Island). The report states that the species is not threatened within Hawkes Bay, in contrast to the national classification of 'At Risk-Declining'. This is because most of the population is considered to have low predation pressure due to pest control at Cape Kidnappers and the Port, and lack of predators on Motu-o-kura (Bare Island; Walls 1998).

Blue penguins may nest in other locations within the Port, as well as the revetment to be affected, potentially preferring areas that are less affected by sea conditions. Further limestone revetments are located to the west of the Port, forming groynes and seawalls along Hardinge Road. Figure 2 illustrates the potential extent of limestone revetment walls at Napier Port, most of which are underneath wharf floors (as estimated by Peter Frizzell, Port Napier). In addition, blue penguins have been found nesting under containers and in pipes stacked on the wharf.

4.2 Overview of biology and ecology

Nest Locations

Blue penguins are widespread around the New Zealand coastline, breeding in colonies or sometimes singly. Colonies are generally small, numbering only a few pairs. The largest colonies include the Oamaru population that comprises more than 1,000 individuals (Flemming 2013). Birds can be found nesting some distance inland, and in virtually any habitat, including coastal dunes, scrub and forest, farmland, and residential areas (Marchant and Higgins 1990).

Birds breed in a wide variety of burrow types; the penguins sometimes dig their own, or commandeer the burrows of other birds (such as sooty shearwaters; *Puffinus gavia*), but also use logs, caves, crevasses in rocky shorelines, and all manner of artificial nest sites including under houses and specially-made nest boxes. At Napier Port, the penguins are thought to nest within the revetments, but have also been found on the Port wharves, in pipes, and between sheets of plywood. Nest sites are used throughout much of the year, and the same nest site is often used year to year.

Figure 2. The potential extent of limestone revetment at Napier Port

Breeding Cycle

The breeding cycle of blue penguin is shown in Table 1. Dates can vary between locations. In some instances, egg laying can occur as late as December, resulting in a protracted breeding season.

Table 1: Indicative breeding cycle of blue penguins, based on Flemming (2013) and Dann (2013).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Burrow occupation	■	■	■			■	■	■	■	■	■	■
Egg laying							■	■	■	■	■	
Guarding young								■	■	■	■	■
Moulting	■	■	■									■

Moulting usually occurs after breeding has been completed. During this period of 2-3 weeks, the loss of waterproofing means that an adult bird cannot enter water. After moulting, the birds undertake extensive foraging trips which can last for more than a week before they return to their burrow. This short period is the only time when blue penguins are unlikely to be in their burrows. Prior to the onset of breeding, a pair will remain in the nest together for about five days, approximately 30 days before the first egg is laid. The pair then return to the sea for a number of days before returning and remaining ashore for another five days, at which point the first egg is laid.

Blue penguins usually lay two eggs which are incubated by both the male and female in stints of 1-10 days. Incubation lasts approximately 35 days. Chicks fledge at 7-9 weeks. Pairs can re-lay if clutches fail, and sometimes begin a second nest after successfully breeding.

Foraging

Blue penguins are known to travel significant distances from the colony when foraging, for example, more than 45 kilometres (Hoskins *et al.* 2008; Preston *et al.* 2007). Mean maximum distances are generally considerably less (e.g. 16.9 to 19.8 kilometres from three colonies in Bass Strait, Australia; Hoskins *et al.* 2008). Blue penguins are typically demersal divers - feeding on the sea bottom - and are thought to use the seabed to trap their prey (Chiaradia *et al.* 2007). They have been shown to dive to 55 metres, but generally feed in shallower waters (e.g. Chiaradia *et al.* 2007; Hoskins *et al.* 2008). The few dietary studies undertaken in New Zealand indicate that the species takes a variety of inshore species of small fish and squid (Flemming *et al.* 2013; Fraser and Lalas 2004; van Heezik 1990).

Threats

Blue penguins are potentially affected by a wide variety of threats and perhaps the most widely recognised is posed by introduced predators. These predators such as cats (*Felis catus*), dogs (*Canis familiaris*), ferrets (*Mustela furo*), and stoats (*Mustela erminea*) can prey on eggs, chicks, and adult penguins; and rats (*Rattus* spp.) may

prey on eggs. The impact of particular pest animals appears to vary between sites. For example, white-flippered penguin populations at Flea Bay and Stony Bay, Banks Peninsula, were thought to be most affected by ferret predation (Challies and Burleigh 2004); rats were considered to have been responsible for egg predation in some populations (Stahel and Gales 1987; Perriman and Steen 2000); an analysis of 229 cat scats found blue penguin to be among the most common dietary items (Karl and Best 1982); cats are considered to have had a major impact on some penguin populations in Australia (Stahel and Gales 1987; Stevenson and Woehler 2008) - at some locations, "numerous observations" of cats with penguins in their mouths were recorded; however, cats were thought to have minimal impact on penguins on Phillip Island, Australia (Dann 1992), and are not considered to be a threat at Oamaru (D. Houston, Department of Conservation, pers. comm., 2017); a study on the West Coast found predators had minimal effect on breeding success (Heber *et al.* 2008).

Perhaps the most striking reports of predation have been those resulting from dogs. A population at Cape Foulwind was decimated by dogs over a few nights, losing 22 adults[1,2]; another at Little Kaiteriteri Beach lost 12 adults to dogs (B. Vander Lee, Department of Conservation, pers. comm., 2014). In both instances, the predator involved was confirmed by veterinarians. At Little Kaiteriteri, the mortality may have reduced the local population by half or more (RKM, pers. obs.).

Blue penguins are also vulnerable to collisions with vehicles when they cross roads to obtain access to breeding areas. In some areas, mortality may be significant, such as the West Coast, where Heber *et al.* (2008) recorded 15 road-killed adult blue penguin in their study area between August and December 2006. On Phillip Island, Australia, vehicles were estimated to kill 180 penguins annually, until traffic management measures were introduced (Dann 2013).

The possible effects of climate change have been relatively well researched in Australia, with authors identifying both positive and negative effects resulting from sea temperature increases (references in Dann 2013).

Other threats include encroachment of coastal developments into breeding areas, as well as increased activities within marine areas, and pollution, particularly oil spills (for example, the wreck of the Rena resulted in 383 oiled penguins being admitted to a wildlife facility for rehabilitation, and 90 dead oiled penguins being collected; Sievwright 2014; Riddell and Kessels 2013).

4.3 Potential effects of construction

Potential effects on blue penguins nesting in the revetment to be affected, as well as in other locations in similar seawalls around the Port, are summarised below:

- Loss of burrows and possible loss of eggs, chicks, and adults as the existing revetment is dismantled.

[1] http://predatorfreenz.org/staunch-penguins-match-stoats-not-dogs/ (downloaded 12 April 2017)
[2] http://www.stuff.co.nz/environment/7183183/Dogs-savage-precious-blue-penguin-colony (downloaded 12 April 2017).

- Overall decrease in available breeding habitat despite reconstruction of a revetment wall in a new position.
- Disturbance of adjacent breeding birds during the construction period.
- Disturbance of foraging birds and birds leaving and returning to breeding burrows during the construction period.

Detailed discussion follows, and options for mitigation are provided in Section 4.4.

Loss of Burrows, Eggs, Chicks, and Adults

If blue penguins are nesting in the revetment to be affected, burrows will be destroyed as the revetment is dismantled. Deconstruction of the revetment will be undertaken in stages, over an 18-24 month period, meaning that birds may be uncovered in the burrow at any stage of their annual cycle, including at incubation, near fledging, or when moulting adults are present. While deconstruction will be undertaken with care, given the potential presence of penguins, it is still nevertheless possible, and probably likely, that eggs, chicks, or adults could be killed.

This cannot be avoided; firstly because it is not feasible to undertake deconstruction of the revetment within the very short 2-3 month period that blue penguins are least likely to be present in burrows. Secondly, blue penguin behaviour and ecology means that stopping birds from using the revetment to be affected is largely impossible. The reasons for this are as follows:

- Assuming that penguins could be captured in their burrows, the birds could then be translocated a significant distance from the Port, and released. However, this was done with blue penguins rehabilitated after an oil spill in Tasmania, Australia, with mixed success. Penguins were initially released 360 kilometres from the location of the oil spill (on the other side of Tasmania), and the first radio-tracked birds returned in three days. As a result, the next release was undertaken a further 120 kilometres south. Of both releases, 56% the birds were tracked to the initial capture location within four months, but the return rate was likely to be higher (Hull *et al*. 1998).

- Capturing of birds within the revetment burrows is likely to be very difficult as the revetment is actually a wide bund on which the wharf has been built (Peter Frizzell, Napier Port, pers. comm.), suggesting that burrows could be many metres deep.

- Blue penguins, unlike many other penguin species, are very tolerant of noise and activity. The birds are unlikely to be disturbed by the major increase in construction activity and noise, including pile-driving within metres of their burrows (Dave Houston, Department of Conservation, pers. comm.). Examples of disturbed and/or noisy situations where blue penguins have been found nesting successfully include beneath working saw benches in a sawmill, and underneath railway track switches (Dave Houston, Department of Conservation, pers. comm.).

- Blocking of burrow entrances is considered to be difficult and potentially dangerous for penguins (Dave Houston, Department of Conservation, pers.

comm.). Penguin burrows in the revetment may have more than one entrance, and it may not be possible to locate and block all entrances. If a burrow was blocked successfully, a blue penguin would be very likely to attempt to find another burrow close by, probably within another section of the revetment to be affected. Further, blocking of burrow entrances may entrap penguins within the revetment, and this would be difficult or impossible to check. Lastly, the method of blocking burrow entrances (by the use of netting, wire mesh, or similar) has the potential to entrap penguins still within the revetment, and also other bird species that may use the revetment for roosting, such as shags or terns.

Summary of Potential Effects: The level of potential effect, both locally and regionally, is difficult to assess without knowing the size of the population present within the revetment to be affected, and the size of the population within the Port environs. However, if penguins are nesting in the revetment, then burrows will be destroyed, and there will be potential for mortality of eggs, chicks, and adults. Because of this, the potential effect is considered to be **major**, given that northern blue penguin is an absolutely protected species under the Wildlife Act 1953.

Decrease in Available Breeding Habitat

Limestone boulders that form the existing revetment will be stockpiled as the wall is deconstructed, and may be re-used as part of the new revetment. New materials may also be used, such as constructed concrete forms to add to the limestone to build the new wall. These are likely to be similar to those comprising the main breakwater, and will also provide potential breeding habitat.

At present, the existing revetment extends above the wharf for much of its length by as much as 1-2 metres (see Plate 1). The new revetment will, however, sit below the wharf floor to allow vessels to moor, and will therefore be lower than the existing revetment. This means that potential available habitat will be reduced, and the quality of the new habitat may also be reduced as burrows are no longer available at greater heights above sea level.

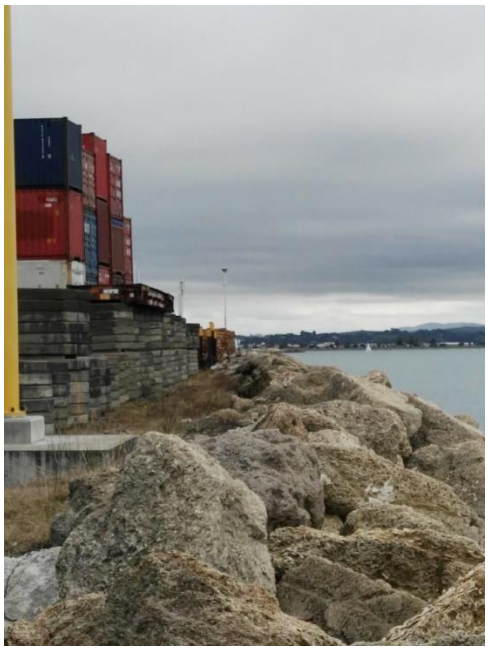

Plate 1: Revetment wall to be affected, showing limestone boulders which will be removed as part of wharf construction.

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Summary of Potential Effects: Determining the level of this effect with existing knowledge is difficult as it is not known where blue penguins nest within the revetment, or whether burrows lower down are more likely to be affected by rough sea conditions on the north-facing revetment. Furthermore, the extent of nesting around the Port is unknown, specifically, whether penguins in the revetment to be affected form a small or large proportion of the Port population. This effect is considered to be **potentially more than minor**.

Disturbance of Adjacent Breeding Blue Penguins

As described previously, blue penguins are capable of nesting successfully in highly modified, busy, and noisy environments. In addition to nesting locations described above in sawmills and railway lines, some major regional populations, such as Wellington Harbour, are often closely associated with suburban areas, with penguins attempting daily crossings of major urban roads to get access to burrows in coastal scrub or under houses and sheds. Lessening the need for road crossings, during which penguins are highly vulnerable to mortality, is one of the reasons for the provision of nest boxes in places such as Wellington.

Summary of Potential Effects: It is unlikely that other nesting penguins close to the revetment to be affected will abandon nesting attempts. The potential effect is, however, considered to be **minor**.

Disturbance of Blue Penguins at Sea

Blue penguins leave their burrows before sunrise, returning just after dusk, but may remain ashore during the day, particularly in the lead-up to egg laying, during incubation and chick rearing, and while moulting. Their arrival and departure times mean that it is highly unlikely that construction or dredging activity will be underway when penguins are leaving or coming ashore. Furthermore, the penguin population at the Port is already accustomed to the movements of ships, including dredging vessels.

Summary of Potential Effects: The timing of penguin movements and construction works will not overlap, and the potential effect is considered to be **minor**.

4.4 Proposed mitigation

Blue Penguin Survey

Data on the size and distribution of the blue penguin population at Napier Port and adjacent areas are lacking. This includes information on whether blue penguins nest in the revetment to be affected and, if they do, how many active burrows are present. Further information is required before decisions can be made on the appropriate level and type of mitigation.

A survey of the Port environs is planned, to be undertaken by a handler/ecologist and a trained, experienced seabird dog during August-September 2017. Breeding will be well underway at this time, and burrows will be sufficiently smelly to ensure that the

dog can locate all burrows with a high level of accuracy. All individual entrances will be marked, e.g. with spray paint. As many of the Port revetments will be surveyed as is feasible and safe to do so, including revetments under wharfs. Also planned for survey are the seawalls to the east of Napier Port, including those along Hardinge Road up to Perfume Point (see Plate 2). This survey will:

- Determine the number of burrows/pairs affected by the proposed wharf construction.
- Define the blue penguin population at Napier Port/Hardinge Road, providing a better regional context for the population.
- Provide the information required to determine the extent and types of mitigation required.
- Provide a baseline of the size of the blue penguin population at Napier Port/ Hardinge Road for future monitoring.

Plate 2: Limestone seawalls along the western edge of Napier Port (distance), around two small bays, including a groyne (centre), and along Hardinge Road (foreground). Pedestrian and cycle path is visible in bottom right corner.

It is important to note that the blue penguin survey is not part of proposed mitigation work, but is required to develop a blue penguin management programme that will successfully offset potential effects on the resident blue penguin population. Mitigation options and priorities are described below.

Blue Penguin Response Plan

Burrows of blue penguins resident in the revetment to be affected will be dismantled, along with the revetment wall. This effect cannot be avoided for the reasons described previously. Dismantling of nests may uncover eggs, chicks at any stage of development, incubating adults or those minding chicks, or moulting adults. Care will be taken to attempt to avoid harming eggs, chicks or adults during dismantling, but the possibility of serious injury or mortality exists.

The Blue Penguin Response Plan proposes to minimise the loss of eggs, chicks, and moulting adults by removing nest contents to a relocation centre. The relocation centre will, as required, incubate eggs, rear chicks, or care for moulting adults, until individuals can be returned to the sea.

The National Aquarium in Marine Parade, Napier, maintains a blue penguin population and has staff trained in blue penguin care, including a veterinarian who has worked with penguin species in Antarctica. National Aquarium management are positive about their involvement in the project that would see a relocation centre set up, possibly on Port land, staffed by National Aquarium rare species keepers, to care for any eggs, chicks, and adults that are rescued from the revetment wall.

Daily monitoring of the affected revetment will be undertaken during periods when sections of the wall are being dismantled, over the 18-24 month construction timeframe. Burrow entrances marked during the baseline survey will assist in determining where burrows are likely to be located. However, other birds may also be present, such as penguins evicted from original burrow locations due to revetment deconstruction.

Details of the Blue Penguin Response Plan are yet to be finalised; for example, who will undertake daily monitoring, whether contractor training will be required, where the relocation centre will be located, and when and where penguins will be released. Local iwi may be able to be involved in daily monitoring work.

The objective of the Blue Penguin Response Plan is to minimise loss of eggs, chicks, and adults. If the revetment can be deconstructed with no or minimal mortality, and any recovered eggs, chicks, and adults can be successfully released back to the wild, then loss of nests and adults will be negligible.

Approach to be Applied:

- If no penguins are found during the baseline survey, no daily monitoring is required. However, a response plan should still be put in place to cover the possibility of contractors undertaking revetment deconstruction unexpectedly discovering a penguin.
- If penguins are found during the baseline survey, daily monitoring should be undertaken, and a relocation centre established, with guidance and assistance from the National Aquarium.

Pest Animal Control at Napier Port

Given the vulnerability of eggs, chicks, and even adult blue penguins to predation, control of pest animals has the potential to offset any possible loss of nests or adults as a result of construction works.

Napier Port undertakes ongoing management of rodent populations through trapping and baiting, as part of requirements set by the Ministry of Primary Industries. Control efforts are increased in response to reports or in high risk areas. The Port also periodically uses a pest control company to live-capture feral cats. Port staff have reported seeing a mustelid, probably a stoat, and mustelids are not currently controlled. Lastly, dogs are not an issue at the Port, given that it is largely fenced.

The existing control programme means that it is not clear whether increasing the intensity (and type) of pest control will translate as greater protection for the Port penguin population, thereby mitigating potential loss of nests or adults. Furthermore, some blue penguin populations are not thought to be affected by feral cats (see Section 4.2), and it is not known whether penguins at the Port are preyed on by cats.

In order to better determine existing levels of pest animal populations at the Port, infra-red 'camera trap' systems - which take a photograph when triggered by movement - will be used to survey and monitor the Port for rodents, mustelids, and cats. Infra-red systems are required as pests such as mustelids and cats are mostly active at night. Information gained from the survey will be used to evaluate whether increased pest control at the Port is likely to be sufficient to offset potential effects on the resident penguin population, or whether pest control at another population may be necessary. An ongoing monitoring programme will assist Port management decisions regarding the need for increased control, particularly for feral cats.

Approach to be Applied:

- Undertake a survey of existing pest animal populations at the Port using camera traps, starting as soon as possible.
- Establish ongoing monitoring of pest animals using camera traps to assist with pest management.
- If data obtained from the cameras indicate that mustelids use the Port, ongoing mustelid control should be implemented as a long-term practice to protect both blue penguins and any other nesting birds.
- If data obtained from the pest animal survey indicates the presence of cats, one-off control operations should be undertaken to protect blue penguins and any other nesting bird populations.

Management of the Hardinge Road Blue Penguin Population

Blue penguins are thought to nest all along the Hardinge Road seawall and groynes. Undertaking pest control to protect this part of the local population would help to mitigate the potential effects of the wharf construction on the penguins in the revetment, although the extent and size of the population has never been quantified. The abundance and distribution of blue penguins in this area will be assessed by the

use of a seabird search dog at the same time as the survey of the Port population in August-September 2017.

Any penguins in this area are very vulnerable to predation by uncontrolled dogs, and receive no pest animal control. These penguins are also likely to be very accessible to people. Undertaking pest control in such a public and well-used area is fraught; any traps or bait stations would be highly visible and vulnerable to theft or tampering.

Installation of interpretation/educational signage at either end of Hardinge Road, informing people of the importance of controlling their dog in the area, may be the best approach. However, this could also bring unwanted attention to the presence of penguins, and should be discussed with staff from the Department of Conservation.

Approach to be Applied:

- Depending on the results of the baseline survey, investigate the feasibility of pest control in the area.
- Seek advice on the appropriateness of signage in the area.

Management of a Further Blue Penguin Population

Management of a further blue penguin population in the wider Napier area could be appropriate to offset the adverse effects of construction works at the Port in the following circumstances:

- If a significant population of blue penguins are found to be nesting in the revetment (for example, 20 or more pairs).
- If deconstruction of the revetment results in significant levels of loss of breeding attempts or adults.
- If an increase in pest control at Napier Port is not considered likely to provide an increase in productivity of blue penguins in the Port.
- If the population along Hardinge Road is very small and/or is considered too difficult to protect through pest animal control.

The only other significant populations of blue penguins known in the Hawkes Bay region are on at Motu-o-kura (Bare Island) and Cape Kidnappers. Both have low predation pressure: Motu-o-kura is predator free, and the Cape Kidnappers population receives pest control as part of the Cape Sanctuary project. It is likely that there are penguins nesting at other locations along the coast that are largely unknown at present. Identification of such places should be investigated in the first instance through discussions with local ornithologists, iwi, and Department of Conservation staff.

In the absence of any clues, areas of coastline could be searched using a seabird dog and its handler/ecologist at the same time as the baseline surveys are undertaken at the Port and surrounds. Places to investigate could include adjacent coastline to the Cape Kidnappers population, and further south around Waimarama, approximately opposite

the Motu-o-kura population, which may be producing young birds that are searching further afield for nest sites.

If successfully identified, the new population of blue penguins could then be managed by a combination of monitoring, pest animal control, provision of nest boxes, and revegetation as required. Proximity to a residential community would allow involvement of the public in the management of the penguins.

Approach to be Applied:

- Consult with people who may know of blue penguin sightings or possible colonies in the Hawkes Bay region.
- Survey possible localities in August-September 2017 using a seabird detection dog.
- Implement a management programme if required.

Public Education and Blue Penguin Advocacy

Napier Port has indicated that it would like to undertake blue penguin advocacy and education, using the penguin population at the Port to raise awareness of the species and threats to its survival, and to demonstrate the feasibility of protecting indigenous seabird populations in industrial and urban environments. This could be done using a combination of interpretation signage (a major public walkway and cycleway runs along the Port fence line for approximately one kilometre) and educational material available on the Port website, and through the National Aquarium. Establishment of nest boxes at the Port, assuming they were then inhabited, would enable the use of live feed burrow cameras which could be streamed both to the aquarium and the Port's website.

Approach to be Applied:

- Establish educational signage along the Breakwater Road walkway/cycleway, and possibly along Hardinge Road.
- Install nest boxes at the Port, and burrow cameras if nesting attempts are made within the boxes.

5. BLACK-BILLED GULL - TARAPUNGA

5.1 National, regional, and local status

The endemic black-billed gull is classified as Threatened-Nationally Critical (Robertson *et al.* 2017), and is the world's most threatened gull species[1], with the population estimated at 90,000 mature individuals (McClellan 2008). Most of the population breeds on riverbeds in Southland. Region-wide aerial photographic

[1] BirdLife International: http://datazone.birdlife.org/species/search Red List classifications of 52 species of gull, downloaded on 22 February 2017.

surveys from 2004-2006 counted an annual maximum of 57,000 birds in colonies. Canterbury also supports a significant proportion of the population, with smaller numbers in Otago, Marlborough, and the West Coast. The Southland population has undergone a catastrophic decline of more than 80 percent over 30 years (McClellan 2008). Similar declines have been demonstrated elsewhere in the South Island (McClellan *et al*. in prep).

The North Island population comprises approximately five percent of the total black-billed gull population, but its distribution is extending, although it may not be increasing in numbers (McClellan and Habraken 2013 [updated 2017]). A national survey for black-billed gulls was coordinated for the 2016-2017 breeding season (C. Mischler unpublished data). The preliminary North Island count was 698 nests, or 1,396 breeding birds.

A black-billed gull colony established on the north eastern end of Geddis Wharf (No. 3) in Napier Port in 2015 (see photographs in Appendix 1). Once the colony contained chicks, the adults became extremely aggressive towards Port staff, diving at them when they were working on the wharf. After the colony had abandoned the wharf, once breeding was complete, Port staff installed plywood sheets at the colony site which were placed on an angle in an attempt to discourage further nesting. A colony did not re-establish in the following season.

Aggressive behaviour reported by Port staff was recorded only once, by a single bird in one particular colony, during intensive monitoring of *c*.5,000 nests in Southland between 2004-2006 (RKM, pers. obs.). However, the behaviour has also been reported from another North Island colony that regularly used the Tokaanu Power Station, at Turangi (J. Scrimgeour, Department of Conservation, pers. comm.). In that case, Genesis Energy staff installed roof spikes to attempt to stop the birds nesting on the buildings, which resulted in the birds establishing elsewhere on the site. Visual barriers were also installed in an attempt to allow staff to walk between buildings without being attacked, which did not work. Department of Conservation staff observed the birds' behaviour and resolved to help Genesis Energy encourage the birds to nest elsewhere (specifically at the Tongariro River delta). Whether this project was implemented, or successful, is not known. However, a black-billed gull colony was located during the 2016 breeding season at Motuoapa Marina, Lake Taupo, not far from Tokaanu (C. Mischler, Otago University, pers. comm. 2017). The colony may have comprised many birds from the previous colony.

The reason for this aggressive behaviour developing within a black-billed gull colony is not clear, but is presumably due to the regular proximity of people to nests containing chicks in these two colonies. The behaviour is clearly unpleasant for people who experience it, but it is also likely that the adults behaving aggressively in these situations are under stress.

In the South Island, most black-billed gull colonies establish in gravel-bedded rivers, and the gulls have evolved to cope with the shifting morphology of the riverbeds. The locations of colonies in these rivers generally change from year to year, often in response to a colony site no longer existing by the following breeding season (McClellan 2008). As such, the gulls that nested at Port Napier and the Tokaanu Dam are able to cope with changing colony location between years.

5.2 Potential effects of construction on black-billed gull

It is unlikely that black-billed gulls will re-establish at Port Napier, as the original colony location is no longer available and no obvious alternative exists. The original colony location is in another part of the Port, and will not be directly affected by the proposed works.

Summary of Potential Effects: None.

Approach to be Applied:

No action required.

6. WHITE-FRONTED TERN - TARA

6.1 National, regional, and local status

White-fronted tern (*Sterna striata striata*) is classified as At Risk-Declining (Robertson *et al.* 2017). It breeds along the coast of New Zealand and northeast Tasmania, sometimes on gravel-bedded rivers (another subspecies breeds in the New Zealand subantarctic). Surveys undertaken by the Ornithological Society in the 1990s indicated a population of 24,000-30,000 mature individuals (BirdLife International 2017). White-fronted tern is considered to be declining, primarily due to the effects of introduced predators. The species is difficult to monitor as colony locations can change between years. The size of the Hawkes Bay regional population is not known.

White-fronted tern established a breeding colony on a revetment on the eastern side of the triangular wharf in 2015 (see photographs in Appendix 1). It is not clear how often white-fronted tern nest at the Port, but it is likely that they have nested here before.

6.2 Potential effects of construction and dredging

White-fronted terns may breed again at Port Napier, as suitable habitat is available on the surface of revetments, including the former 2015 colony location. This particular site will not be directly affected by the proposed works. However, terns that breed at this or other locations within the Port will experience greater levels of noise while wharf construction is underway.

Clearly, the white-fronted tern colony that nested at the Port in 2015 would have been subjected to unavoidable disturbance and noise from wharf activities taking place within metres of nests (see Plates 3 and 4). This indicates that the species is capable of tolerating intermittent but high levels of human disturbance.

Nevertheless, the fact that the colony remained at this location during the breeding season does not necessarily mean that the levels of human disturbance did not have an effect on productivity. Disturbance has been shown to affect breeding birds in numerous national and international studies, often causing a loss in body condition, sometimes leading to decreases in productivity. In the case of coastal breeding birds in New Zealand, numerous incidents of predation by southern black-backed gulls, and

sometimes red-billed gulls, have been reported when nesting birds are disturbed and take to the air. Very small numbers of both species nested at the Port in 2015 (Appendix 1) and could conceivably be an issue if terns are disturbed from their nests.

On the other hand, the white-fronted tern colony is likely to have benefited from rodent and cat control undertaken by the Port, and this could offset any potential negative effects resulting from the inevitable disturbance from Port activities.

Summary of Potential Effects: if white-fronted terns establish a colony again in the same or similar location to 2015, the potential effect of disturbance caused by construction in a different area of the Port is considered to be **minor**.

Approach to be Applied:

- Though the potential effects of wharf construction on white-fronted terns are considered to be minor, pest animal control at Napier Port (see Section 4.4) is likely to have a significant beneficial effect on nesting success of this and any other bird species nesting at the Port. This has the potential to offset any potential negative effects of existing levels of disturbance from normal Port activities.
- Port staff undertaking work adjacent to any future white-fronted tern colony that disturb the terns, causing them to take to the air, should keep an eye out for southern black-backed gulls that take the opportunity to prey on eggs and chicks. If this behaviour is observed, then advice should be sought on the control of southern black-backed gulls nesting at the Port (the species is not protected).

7. SHAG SPECIES

Shags are not known to use the revetment to be affected for roosting. The close proximity of the revetment to the movements of shipping containers and associated vehicles is likely to reduce the attractiveness of the site as a roost. Nevertheless, the newly-constructed revetment will be entirely beneath the wharf and, subsequently, potential roosting areas will be lost. However, this is considered a minor effect given it is likely that the site is not an important roost site. This assumption should be assessed further.

Shags use the main breakwater for roosting. Black shags - kawau (*Phalacrocorax carbo novaehollandiae*; At Risk-Naturally Uncommon) were observed during the site visit, but another four species may also be present at times, all of which are known from Hawkes Bay: spotted shag - parekareka (*Stictocarbo punctatus punctatus*; Not Threatened), pied shag - kāruhiruhi (*P. varius varius*; At Risk-Recovering), little black shag - kawau tūi (*P. sulcirostris*; At Risk-Naturally Uncommon), and little shag - kawau paka (*P. melanoleucos brevirostris*; Not Threatened). It is not known whether shags nest on the breakwater, but it seems unlikely given the high level of exposure of the site. Shags using this roost site will be accustomed to the movement of vessels in and out of the Port, and other wharf activities.

However, roosting shags may be disturbed by construction noise, particularly pile-driving, which is considered to be the most significant cause of noise of all activities

(Marshall Day Acoustics 2017). Human disturbance is known to affect shag/ cormorant roosts (e.g. Chatwin *et al.* 2013; Cornelius *et al.* 2001). However, the effect of noise alone on shag species is not well understood. It is possible that the noise of pile-driving may stop shags from roosting on the main breakwater, at least for periods when pile-driving is underway. If this occurs, shags will roost elsewhere, although it is not known if the availability of shag roosts is limited in the Napier area.

Summary of Potential Effects: the revetment is assumed to be a rarely-used roost site for shags, and therefore the effect of rebuilding the revetment under the wharf, and the associated loss of the potential roost, is considered to be **minor**.

The potential effect of the noise generated by pile-driving disturbing roosting shags is **potentially more than minor**, but will be **a temporary effect**.

Approach to be Applied:

- The revetment to be affected and the main breakwater should be surveyed for roosting shags (and any other species) at regular intervals prior to work commencing, to assess the relative importance of the two sites for shags. This will determine the level of use of the existing revetment, and therefore whether loss of roost habitat should be mitigated.
- The main breakwater should continue to be surveyed during the initial periods of pile-driving, to assess whether the noise generated during pile-driving reduces the use of the breakwater for roosting shags.

Mitigating the temporary or permanent loss of shag roosts is complicated. Adjacent coastline that is free from human disturbance is limited, and development of artificial shag roosts is not well tested in New Zealand. If the revetment is found to be regularly used by shags, investigation of possible options for roost site creation will be undertaken with relevant experts. Likewise, if pile-driving is found to reduce shag use of the main breakwater, this should also be discussed with relevant experts to determine whether temporary artificial roosts are warranted and feasible.

8. POTENTIAL EFFECTS OF DREDGING ON FORAGING SEABIRDS

Species Present

A high diversity of seabirds is present inshore around Napier and offshore to Pania Reef, and beyond to the site where dredging material will be deposited. These include the three species of gull, five species of shag, white-fronted tern, and blue penguin discussed above. Furthermore, two major restoration projects, Poutiri Ao ō Tāne and Te Matau a Maui (Cape Sanctuary) have seen the translocations of five species of burrowing seabird to the mainland since 2008. Young birds that have fledged from these sites will likely be foraging within this general area.

Further species may also use the area. The list below has been compiled from three eBird checklists taken from boats and ships leaving Napier[1] (see Appendix 1 for a description of eBird), and also includes the five species translocated to the two mainland sanctuaries north of Napier:

- Buller's mollymawk (*Thalassarche bulleri*; At Risk-Naturally Uncommon).
- Wandering albatross (*Diomedea exulans*; Migrant).
- Shy mollymawk (*Thalassarche cauta steadi*; At Risk-Declining).
- Salvin's albatross (*Thalassarche salvini*; Threatened-Nationally Critical).
- Royal albatross (not identified to species - either *Diomedea epomophora epomophora*, or *D. sanfordi*; both At Risk-Naturally Uncommon).
- Northern giant petrel (*Macronectes halli*; At Risk-Recovering).
- Snares cape petrel (*Daption capense australe*; At Risk-Naturally Uncommon).
- Fairy prion (*Pachyptila turtur*; At Risk-Relict).
- Fluttering shearwater (*Puffinus gavia*; At Risk-Relict).
- Buller's shearwater (*Puffinus bulleri*; At Risk-Naturally Uncommon).
- Flesh-footed shearwater (*Puffinus carneipes*; Threatened-Nationally Vulnerable).
- Grey-faced petrel (*Pterodroma macroptera gouldi*; Not Threatened) (translocated species, also already known from the area).
- Westland petrel (*Procellaria westlandica*; At Risk-Naturally Uncommon).
- Common diving petrel (*Pelecanoides urinatrix*; Not Threatened) (translocated species, also already known from the area).
- Australasian gannet (*Morus serrator*; Not Threatened).
- Cook's petrel (*Pterodroma cookii*; At Risk-Relict) (translocated species).
- New Zealand white-faced storm petrel (*Pelagodroma marina maoriana*; At Risk-Relict) (translocated species).
- Mottled petrel (*Pterodroma inexpectata*; At Risk-Relict) (translocated species).

Other seabird species are likely forage in the area irregularly, seasonally, or during bad weather.

Disturbance of Foraging Birds

Foraging birds may be disturbed by an increase in vessel movements within the Port, primarily due to dredging activities, and possibly along the route towards Pania Reef and beyond to the site where dredging material will be deposited.

Foraging birds may also be disturbed by the airborne and underwater noise generated by pile-driving. The assessment of acoustic effects (Marshall Day Acoustics 2017) estimates that pile-driving will produce peak underwater noise levels of between 180 and 250 dB in the immediate vicinity (within metres) of the piles. Little is known of the hearing ability of birds underwater, although they clearly can hear, as some underwater acoustic scaring devices on fishing boats are successful in reducing bycatch of seabirds. A review of the general hearing abilities of birds was undertaken by Marshall Day Acoustics (2013) for the assessment of effects of the potential

[1] Russell Cannings, June 2016, Napier to Little Rock (Checklist S30101412); Noam Markus, November 2016, 10 kilometres after leaving Napier Port (Checklist S2590244); Bruce Wedderburn, January 2008, cruise ship leaving Napier Port (S13233905).

deconstruction of part of the Rena wreck. Their summary was that the hearing responses of birds out of water appeared to be the same as those for humans. In the absence of any useful data, it is likely that the main potential effect would be avoidance of the area surrounding the Port during pile-driving by some seabird species. The distance at which behavioural responses might exist is unknown, but could be hundreds of metres, and possibly more than one kilometre.

It is very unlikely that the increase in vessel activity, the increase in airborne and underwater noise, or the potential for increased turbidity at the work site or the deposition site (which could affect visibility underwater and/or distribution of fish populations), will have a more than minor effects on any seabird species foraging in the marine environment. Firstly, seabirds foraging in the area are already likely to be accustomed to ship movements along the coast. Secondly, all of the seabird species identified above are capable of flying or swimming many kilometres to forage, and are likely to have extensive foraging areas. Only a small part of any one species' foraging range is likely to be affected by noise, vessel movements or sediment plumes, leaving significant, sometimes vast, alternative areas for foraging. Examples are provided below:

- Blue penguins forage inshore and over the continental shelf. Birds are known to travel significant distances from the colony when foraging, for example, more than 45 kilometres (Hoskins *et al.* 2008; Preston *et al.* 2007). Mean maximum distances are generally considerably less (e.g. 16.9 to 19.8 kilometres from three colonies in Bass Strait, Australia; Hoskins *et al.* 2008). Blue penguins will leave their burrows at the Port and surrounds prior to pile-driving commencing, and will return to shore once works have ceased for the day.

- During breeding on inland rivers, banded black-billed gulls have been recorded foraging up to 50 kilometres from their nest (RKM, unpublished data). Fisheries observers have recorded large numbers of black-billed gulls around fishing vessels many kilometres offshore during the non-breeding season (P. Langlands, pers. comm.).

- The foraging trips of Australasian gannets at the Cape Kidnappers colony have been studied using GPS loggers. The mean distance from the colony recorded by 21 tracked gannets was 55.6 ± 23.3 kilometres with birds flying an average of 267.9 ± 120.6 kilometres during each foraging trip from the colony (Machovsky-Capuska *et al.* 2014).

- Westland petrel is an example in the above list of a pelagic seabird. Pelagic seabirds have vast foraging ranges which are becoming better understood with the use of GPS tracking technology. Westland petrels only breed on the New Zealand mainland just south of Punakaiki on the West Coast of the South Island. The use of geolocators has shown that the species remains within 1,200 kilometres of its colony during breeding, but during the non-breeding season can travel to locations off the coasts of Chile and Argentina (Landers *et al.* 2011).

Summary of Potential Effects: Disturbance of seabirds by increased vessel movements, airborne and underwater noise, and potential sediment plumes at and around the Port and at the deposition site is likely to be a **less than minor** effect for pelagic seabird species, and a **minor** effect for other seabird species.

9. POTENTIAL EFFECTS OF DREDGING ACTIVITIES ON THE AHURIRI ESTUARY

The Ahuriri Estuary is located approximately two kilometres due west of the Port. The estuary is the most significant habitat of its type located on the east coast of the North Island between Wellington and Bay of Plenty (Department of Conservation 2012). Over 70 bird species have been recorded at the location, including international migratory species such as eastern-bar tailed godwit (*Limosa lapponica baueri*; At Risk-Declining), and numerous other nationally Threatened and At Risk species such as Australasian bittern (*Botaurus poiciloptilus*; Threatened-Nationally Critical) and royal spoonbill (*Platalea regia*: At Risk-Naturally Uncommon) (Department of Conservation 2012). The Ahuriri Estuary is one of the most important wintering sites in New Zealand for pied stilt (*Himantopus himantopus leucocephalus*; Not Threatened; Southey 2009).

The primary concern for estuary birds is the potential for increased sedimentation from the dredging and deposition activities to affect intertidal food sources within the estuary. The Cawthron Institute report (Sneddon *et al.* 2016) on the assessment of effects of dredging and spoil deposition addresses the likely extent of fine sediment plumes from dredging activities affecting the Ahuriri Estuary. They conclude (p122) that the estuary's current exposure to suspended sediments from catchment inputs is likely to be far greater than any dredging or disposal plumes that might enter the estuary on tides. Furthermore, marine input into the estuary is considered to be low (Eyre 2009). Benthic communities present within the estuary will be adapted to tolerate high levels of terrestrial inputs. On this basis, it is unlikely that food resources used by the numerous bird species - such as crustaceans, shellfish, snails, and marine worms - will be affected by dredging activities at the Port.

Summary of Potential Effects: The possibility of increased levels of sedimentation in the Ahuriri Estuary is considered low and the potential effect is likely to be **minor**.

Approach to be Applied:

No actions required.

10. SUMMARY

Napier Port is proposing to construct a new wharf at the northern edge of the Northern Container Terminal. The works, including wharf construction and dredging, are predicted to require 18-24 months to complete. The existing revetment along the northern edge will be deconstructed and a new revetment built that will sit underneath the new wharf. The existing revetment is thought to be used by blue penguin for nesting. If present, the work will directly affect any penguins nesting in the revetment and the effect is considered to be major. A blue penguin management programme will be developed that will include a number of actions. The proposed approach includes:

- A survey to assess the extent of use of the revetment during the blue penguin breeding season (August-September 2017), including other revetments around the Port and along Hardinge Road.
- A blue penguin response plan, involving daily inspections during deconstruction of the revetment, and establishment of a relocation centre to care for eggs, chicks and/or adult penguins as required.
- Assessment and ongoing monitoring of pest animal numbers at Napier Port.
- Further pest animal control (in addition to that already occurring) if and when required.
- Investigation of the feasibility of managing the Hardinge Road penguin population, subject to findings of the baseline survey.
- Investigation of a management programme for another blue penguin population in the Hawkes Bay region, if required.

The revetment to be affected is not thought to be an important shag roost, and its loss will therefore have only a minor effect on the local shag population. However, this assumption will be assessed by undertaking a field survey.

Construction, particularly pile-driving, and also dredging has the potential to disturb blue penguins and other species roosting and nesting in other parts of the Port such as white-fronted terns and various shag species. Blue penguins are the least likely to be disturbed, and potential effects are likely to be minor. White-fronted terns also nest within metres of active wharf areas, and effects are also considered to be minor. Any future white-fronted tern colonies at the Port will benefit significantly from an intensive pest control programme. Shags are more easily disturbed by human activities, and those species that roost on the main breakwater may be disturbed by the noise generated by pile-driving. As such, any effects may potentially be more than minor but will be temporary. The approach proposed is to assess whether bird use of the main breakwater decreases during pile-driving and, if it does, investigate the feasibility of providing artificial alternatives for the remaining duration of the works.

Away from the Port, dredging activities, including noise from pile-driving, increased vessel movements and the deposition of dredged material out to sea, has the potential to disturb foraging birds and affect their foraging grounds through sediment plumes affecting underwater visibility or distribution of fish populations. This is considered to be a less than minor effect for pelagic seabirds, and a minor effect for other seabirds, given the extensive foraging ranges of seabird species.

The possibility of increased levels of sedimentation in the Ahuriri Estuary is considered low, and any potential effect is likely to be minor. This is because the estuary is likely to have a low marine input, and the estuary's exposure to sedimentation from terrestrial inputs is far greater.

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eBIRD PHOTOGRAPHS OF SPECIES BREEDING AT PORT NAPIER

The eBird website is a real-time, global online checklist programme. People observing single birds through to people making checklists of all birds seen at a location submit their observations on the website. Results are available to anyone through searches by species or specific areas. The website is fast becoming a valuable source of information to assist with developing species lists of birds present in certain locations. For example, in 2014 observers submitted almost 61 million observations worldwide. A total of 646 checklists have been submitted for the Hawkes Bay region (as of February 21 2017).

On 5 November 2015, a Canadian birder and photographer, Noam Markus, submitted an eBird checklist of all birds seen from a cruise ship docked at Port Napier[1]. He observed seven species in total in 30 minutes: Australasian gannet (three birds), black-billed gull (a breeding colony of approximately 150 birds), red-billed gull (small numbers nesting among the black-billed gull colony), black-backed gull (at least one pair nesting on the roof of a port building), and white-fronted tern (a breeding colony of several hundred birds). He submitted photographs of four of the species, which are reproduced below with permission.

Plate A1-1: Black-billed gull (Threatened-Nationally Critical) colony located on the north-eastern end of Geddis Wharf (No. 3). Photograph Noam Markus. 5 November 2015.

[1] Ebird checklist S25714865 downloaded from http://ebird.org/ebird/view/checklist/S25714865 on 21 February 2017.

Plate 2: Close up of black-billed gull breeding colony. Photograph Noam Markus. 5 November 2015.

Plate 3: Close up of black-billed gull breeding colony showing red-billed gulls (Threatened-Nationally Vulnerable) also nesting within the colony. Photograph Noam Markus. 5 November 2015.

Plate 4: White-fronted tern (At Risk-Declining) breeding colony located on the eastern side of west pier. Photograph Noam Markus. 5 November 2015.

Plate 5: Detail of white-fronted tern breeding colony.
Photograph Noam Markus. 5 November 2015.

Plate 6: Pair of breeding black-backed gull (Not Threatened) nesting on the roof of an unidentified port building. Photograph Noam Markus. 5 November 2015.

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