

# A baseline survey of the indigenous bird values of the Nelson City coastline

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Cover Image: A mixed flock of kawai pāteketeke / king shags (*Leucocarbo carunculatus*) and kawai tikitiki / spotted shags (*Stictocarbo punctatus*) roosting on a rock along the north Nelson City coastline. In this image there are nine adult and two first-year kawai pāteketeke / king shags, and four kawai tikitiki / spotted shags. One of the two first-year kawai pāteketeke / king shags in this image had been banded as a chick at Kuru Pongi / North Trio in July 2019. This is the first kawai pāteketeke / king shag roost site that has ever been recorded in the Nelson City Coastal Marine Area. Image credit: David Thomas.

## Executive Summary

Nelson City Council (NCC) is one of several agencies that have statutory responsibilities relating to the sustainable management of the natural values of Nelson City's coastline, including its indigenous bird values. To discharge these responsibilities as efficiently and effectively as possible, NCC needs to build and maintain a detailed and up-to-date picture of the spatial distribution of indigenous bird values along the Nelson City coast. Knowledge of the distribution and abundance of coastal birds in Nelson City is incomplete, so to fill this knowledge gap a coastal bird survey was carried out along the entire Nelson City coastline in December 2020.

A total of 97 km of the Nelson City coastline was traversed either by foot or by boat, and the presence and number of all species of birds and marine mammals encountered was recorded for each separate 1 km section of coastline surveyed to enable spatial patterns in the relative abundance of key species to be mapped to a 1 km resolution.

Fifty bird species and two marine mammal species were detected during this survey. Thirty-five of these bird species (70%) are native to New Zealand, and 16 species (32%) are ranked as either Nationally Threatened or At Risk under the New Zealand Threat Classification System. Hotspots of high native species diversity occurred along relatively unmodified sections of coastline with comparatively little recreational use, including the northern Nelson City coastline between Whangamoā and Cape Soucis, and the Nelson Boulder Bank and Glenduan foreshore. In contrast, sections of coastline adjacent to urban and suburban areas and SH6 supported a comparatively low density of native bird species, likely due to higher rates of human disturbance and the presence of structures built to reduce rates of coastal erosion.

A major highlight of this survey was the discovery of a flock of 19 kawau pāteketēke / king shags roosting on a rock stack near the Whangamoā Estuary. This is the first time that this Nationally Endangered species has been recorded within Nelson City's coastal marine area, and this is the first roost site to have been recorded outside of the species' core range within the Marlborough Sounds. This survey has confirmed that the Nelson Boulder Bank continues to provide regionally, nationally and internationally-significant breeding habitat for indigenous coastal bird species, including at least 64% of the Nelson City breeding population of tarāpunga / red-billed gulls, 50% of the Nelson City breeding population of tōrea pango / variable oystercatchers and at least 22% of the Nelson City breeding population of tara / white-fronted terns.

We recommend that this regional coastal bird survey be repeated at five-yearly intervals to enable NCC to maintain a complete, detailed and up-to-date picture of the indigenous bird values of the NCC coastline, and to begin building an understanding of the regional population trends of regionally threatened coastal bird species. We also recommend that the results of this survey be used to re-assess NCC's network of coastal sites of "significant conservation value" listed in Appendix Four of the Nelson Resource Management Plan, Significant Conservation Areas to ensure that this network includes all of the coastal habitats that support internationally, nationally and regionally significant indigenous bird populations and communities within Nelson City.

Keywords: Coastal bird survey, Maritime New Zealand, Nelson City Council, New Zealand Threat Classification System, oiled wildlife response, Tasman District

## 1. Introduction

The coastline of Nelson City and the Tasman District supports nationally and internationally significant populations of indigenous coastal bird species, many of which are ranked as either Nationally Threatened or At Risk under the New Zealand Threat Classification System (Schuckard & Melville, 2013; Schuckard & Melville, 2019; Robertson et al, 2017). A number of these species are highly mobile and are heavily reliant on habitats within the coastal marine area for foraging, roosting and breeding either year-round, or during key parts of their annual lifecycles. Furthermore, many of these species are particularly vulnerable to human activities that result in the disturbance, degradation or destruction of these habitats (Melville & Schuckard, 2013; Schuckard & Melville, 2013; Schuckard & Melville, 2019).

Much of our current knowledge of the coastal bird values of the Nelson City and Tasman District coastlines is based on over 50 years of wader surveys that have been carried out by members of Birds New Zealand (the Ornithological Society of New Zealand). Organised wader counts in the Tasman District began at Farewell Spit in 1961, and in 1983 geographical coverage was further expanded to include several additional sites in both Golden and Tasman Bays. These counts have been used to describe long-term trends in non-breeding populations of indigenous shorebirds present in Golden and Tasman Bays, including both Arctic-breeding and internal New Zealand migrant species (Schuckard & Melville, 2013). More recently, these counts, together with data from Birds New Zealand's *Atlas of bird distribution in New Zealand* Scheme, have been used to describe broad-scale patterns in the distribution of a wider set of coastal bird species along the Tasman District's coastline, to the scale of 10 x 10 km grid squares (Schuckard & Melville, 2019).

Although this work has substantially improved our understanding of the bird values of the Nelson-Tasman coastline, gaps in our understanding still remain (Schuckard & Melville, 2013; Schuckard & Melville, 2019). In particular, although we know that the Nelson-Tasman coastline supports a nationally and internationally significant number of pohowera / banded dotterels (*Charadrius bicinctus*) during the non-breeding season, our knowledge of the breeding distribution of this species along the coastline is very incomplete (Schuckard & Melville, 2013). Similarly, the Nelson-Tasman coastline is known to support nationally and internationally-significant numbers of tōrea pango / variable oystercatchers, however the total population size and distribution of breeding birds along the Nelson-Tasman Coastline is currently unknown (Schuckard & Melville, 2013). Both of these species are highly vulnerable to a range of threats during the breeding season, including depredation by mammalian predators and disturbance by people, vehicles and domestic animals (Melville & Schuckard, 2013). Filling these knowledge gaps is therefore important for Nelson City Council to develop effective coastal policy to protect these coastal-breeding shorebirds and their habitats from disturbance or damage caused by human activities, and for working with partner agencies and local communities to actively manage the most important shorebird breeding habitats. For this reason, Schuckard & Melville (2013) have recommended that a breeding shorebird survey be carried out along the Nelson City and Tasman District coastlines.

To implement this recommendation, Nelson City Council (NCC) and Tasman District Council (TDC) have collaborated to carry out a complete and systematic survey of the indigenous bird values of the Nelson-Tasman coastline in December 2020, to create a regional-scale baseline measure of the diversity, distribution and abundance of indigenous birds inhabiting the Nelson-Tasman coastline, against which future changes in distribution and population size can be measured. The results of the

Tasman District coastal bird survey are summarised by McArthur et al, (2021a), whereas the results of the Nelson City coastal bird survey are summarised in this report. The results of this combined survey will contribute towards informing regional- and local-scale natural resource management policy and conservation management decision-making in the following areas:

**1. Updating the identification and spatial mapping of sites with “significant conservation values” along the Nelson-Tasman coastline**

Regional Councils in New Zealand have a statutory responsibility under the Resource Management Act (1991) to sustainably manage coastal environments in New Zealand. Under the Resource Management Act, all regional council and unitary authorities are required to prepare a Regional Coastal Plan that gives effect to the New Zealand Coastal Policy Statement (NZCPS) (DOC, 2010). The purpose of these plans is to assist councils in achieving the sustainable management of their coastal environments, by outlining objectives, policies and rules that govern which activities councils will allow, control or prohibit in the coastal environment.

Section 6(c) of the Resource Management Act provides a mechanism that contributes to the sustainable management of coastal sites with high natural values, by directing both the Nelson Resource Management Plan (NRMP) and Tasman Resource Management Plan (TRMP) to “identify ecosystems and habitats with significant biodiversity values”. To meet this requirement, Policy 8.1 of Nelson’s draft Regional Policy Statement (NCC, 2016) directs NCC to identify terrestrial natural areas where:

- They are representative of the original vegetation or habitat and of what remains
- There are rare species, communities or habitats present or other features that make them distinctive in local, regional or national terms
- There are a notable range of species, communities or habitats and complex patterns or gradients present
- They are large and compact
- They are well connected to other natural areas, buffer or are buffered by adjoining areas, and provide critical resources to mobile species

Appendix Four of the NRMP includes a list of eight sites within the Nelson City coastal marine area that possess “significant conservation values” (NCC, 2012). Given the changes that have occurred to coastal habitats and the distribution and abundance of coastal bird species along the Nelson-Tasman coastline over the intervening years, the spatially-explicit dataset created by this survey will create a timely opportunity to review and update the indigenous bird values of these existing sites, and to identify additional sites along the Nelson City coastline that now meet the relevant selection criteria.

**2. Improving regional Maritime New Zealand Oiled Wildlife Response preparedness along the Nelson-Tasman coastline**

Under Sections 283 and 284 of the Maritime Transport Act (1994), Maritime New Zealand (MNZ) is required to create and update a New Zealand Marine Oil Spill Readiness and Response Strategy, outlining how MNZ and its partners will respond to a marine oil spill

incident in New Zealand (MNZ, 2018). As part of this strategy, MNZ has signed Memoranda of Understanding with local government agencies to build national- and regional-scale capability and infrastructure to respond to marine oil spill incidents. Under its MOU with MNZ, both NCC and TDC have committed to contribute expertise, equipment and other resources to respond to both Tier 2 and Tier 3 oil spills – those spills that occur at a scale or for a duration that is beyond the capability of the individual operator to respond to (MNZ, 2018).

By creating an updated and much more detailed picture of the spatial distribution of coastal birds and marine mammals along the Nelson-Tasman coastline, the results of this survey will greatly improve NCC, TDC and MNZ's capability to predict the location and severity of oiled wildlife incidents associated with marine oil spills, and as a result these agencies will be able to mount a much more rapid and targeted response to such incidents. This baseline measure of the distribution and abundance of coastal bird species will also provide a comprehensive benchmark against which any adverse impacts of future marine oil spills, and the effectiveness of efforts to control, contain or manage the impacts of these spills, can be quantified. This project deliverable aligns with one of the four principles of MNZ's Marine Oil Spill Readiness and Response Strategy, namely to "use information, research and expertise as key enablers", and in turn aligns with Objective 2.4 of the Strategy, namely to "undertake study and research and gather data to improve the environmental and technical knowledge needed to maintain and enhance New Zealand's readiness and response system" (MNZ, 2018).

### **3. Informing regional threat classification rankings**

In recent years, several regional councils (including Waikato Regional Council, Hawke's Bay Regional Council and Greater Wellington Regional Council) have been working with the Department of Conservation (DOC) to develop a system for assigning regional threat classification rankings to species present within individual regions, using a set of New Zealand Threat Classification System criteria that have been modified to be applicable at a regional, rather than national, scale (Townsend et al, 2008; Crisp, 2020; HBRC/DOC, unpublished data). These regional threat rankings are increasingly being used by regional councils to inform regional conservation management priorities, as they provide a more accurate representation of the regional threat status of bird species which may be faring better or worse in a particular region than they are at a national scale. To assign appropriate regional threat rankings to the bird species present in Nelson City and the Tasman District, accurate estimates of both population size and trend are required for each species. One further outcome of this coastal bird survey therefore is that it will enable both NCC and TDC to update regional breeding population size estimates for several bird species that are either entirely, or partly, restricted to the Nelson-Tasman coastline. These population estimates will in turn allow more accurate and evidence-based regional threat rankings to be assigned to these species in the future, leading to improvements in the sustainable management of these species and their habitats in Nelson City and the Tasman District.

### **4. Implementing the draft National Policy Statement for Indigenous Biodiversity**

The Ministry for the Environment (MFE) has prepared a [Proposed National Policy Statement for Indigenous Biodiversity](#) (PNPSIB), which has recently been released for public consultation. This proposed National Policy Statement sets out objectives and policies for local government

agencies to manage natural and physical resources in order to maintain indigenous biodiversity as required by the Resource Management Act (1991). Although the PNPSIB does not strictly apply to indigenous biodiversity found in the coastal marine area, Policy 13 of the NPS does require local government agencies to “identify the possible presence of, and manage, highly-mobile fauna” (MFE, 2019). More specifically, the PNPSIB requires each regional council to work with local territorial authorities “to survey and record areas outside Significant Natural Areas where highly mobile fauna have been, or are likely to be, sometimes present” and to “include objectives, policies or methods in their policy statements and plans for managing the adverse effects of subdivision, use and development in highly mobile fauna areas, as necessary to maintain viable populations of highly mobile fauna across their natural range” (MFE, 2019).

Many of the indigenous bird species present along the Nelson-Tasman coastline meet the PNPSIB definition of being “mobile fauna”. These include endemic shorebird species such as the pohowera / banded dotterel (*Charadrius bicinctus*) and tōrea / South Island pied oystercatcher (*Haematopus finschi*), which migrate annually between inland breeding grounds in the spring and summer months to coastal non-breeding sites in the autumn and winter (Heather & Robertson, 2015). By mapping the distribution and abundance of these mobile species along the Nelson-Tasman coastline during summer, this survey will fill substantial gaps in NCC and TDC’s knowledge of the regional distribution of these mobile bird species during the summer months in Nelson City and the Tasman District, therefore partially implementing Policy 13 of the PNPSIB.

## 5. Implementing the Nelson Biodiversity Strategy and Nelson Nature programme

Nelson City Council is one of 26 partner organisations that belong to the Nelson Biodiversity Forum that has developed and adopted the Nelson Biodiversity Strategy, a document that sets out a shared vision to “create a biologically rich and sustainable future for Nelson, through aligned action on biodiversity” (Nelson Biodiversity Forum, 2013a). This strategy also sets out an agreed-upon list of goals, objectives, outcomes and priority actions to be worked upon by members of the forum, including:

- Outcome 1: Nationally and regionally threatened indigenous species are sustained or restored.
  - Action 1.1.1: Update threatened species lists for Nelson and identify the active management needs and critical habitats of each species.
- Outcome 5: Biodiversity is resilient in the face of climate change.
  - Action 5.1.1: Complete an inventory of biodiversity and natural features at risk from sea level rise as a basis for future planning of staged coastal retreat for sea level rise with biodiversity objectives included (Nelson Biodiversity Forum, 2013a; 2013b).

In order to contribute to the goals of the *Nelson Biodiversity Strategy*, Nelson City Council has initiated the Nelson Nature programme, a 10-year biodiversity management programme for

the region. The Nelson Nature programme includes six focus areas, one of which is to protect and enhance key coastal and estuarine ecosystems, sites and species. Priority actions in this coastal focus area are to:

- Prioritise key sites for protecting coastal and estuarine biodiversity, including provision for sea level rise; and
- Develop and implement management plans for high priority coastal and estuarine sites

A necessary first step towards implementing these outcome and actions of both the Nelson Biodiversity Strategy and Nelson Nature Programme is for Nelson Biodiversity Forum members to update their understanding of the population size, distribution and regional threat status of indigenous bird species along the Nelson City Coastline. The results of this Nelson City coastal bird survey will therefore assist with the implementation of both the Nelson Biodiversity Strategy and Nelson Nature Programme by ensuring that management actions are directed towards habitats within Nelson City that support regionally- and nationally-significant populations of threatened coastal bird species. These survey results will also provide a comprehensive baseline measure of coastal indigenous bird values in Nelson City, against which the successes of the Nelson Biodiversity Strategy and Nelson Nature Programme can be measured. (NCC, 2020).

This report provides a summary of the results of the first complete survey of the bird values of the Nelson City coastline and provides a number of recommendations for how the information gained can be used to update the mapping of areas with “significant conservation values”, to improve regional oiled wildlife response preparedness, to assess regional threat rankings and to contribute towards the implementation of the PNPSIB, the Nelson Biodiversity Strategy and Nelson Nature Programme. This report also includes recommendations for further survey and monitoring work required to ensure that NCC continues to maintain and improve its knowledge of the spatial distribution, population trends and threats facing Nelson City’s coastal bird fauna.



## 2. Methods

### 2.1 Survey area

A bird surveys was carried out along a total of 97 km of the Nelson City coastline between the 14<sup>th</sup> and 18<sup>th</sup> of December 2020, between Cape Soucis and Richmond. The mainland coastline between Cape Soucis and Glenduan was surveyed by boat, whereas the coastline between Glenduan and Richmond was surveyed on foot. Haulashore Island was also surveyed on foot, whereas Pig, Oyster and Saxton Islands were surveyed by kayak (Figure 2.1).

### 2.2 Field methods

This survey was carried out during the shorebird breeding season, at a time of year when the majority of a number of coastal-breeding shorebird species were occupying established breeding territories and were 'anchored' to active nests or broods of chicks. Carrying out these surveys at a time of year during which a number of these species were relatively sedentary therefore minimised the risk of double-counting birds that would be more likely to disperse over larger distances along the coastline in other seasons. All surveys were carried out during fine weather, and in relatively calm sea conditions.

When surveying the coastline on foot, between one and three observers walked along the foreshore, usually near the high tide mark, recording the identity and numbers of all birds seen or heard, including any birds encountered on the foreshore as well as any birds detected either offshore or further inland. Any birds seen flying overhead were also counted, provided they were flying in a direction perpendicular or opposite to the direction of travel of the observer(s). Birds flying in the same direction that the observer(s) were travelling in were not counted, to minimise the risk of double-counting birds. Special care was taken to systematically scan all areas of dry, un-vegetated gravels or sand on the foreshore, and any muddy backwaters, seepages, ponds, lagoons, rock pools, rock platforms, rocky islands and rock outcrops encountered along the coast to minimise the risk of missing key shorebird taxa such as dotterels, oystercatchers, gulls, terns and herons. Separate counts were recorded for each 1 km section of coastline traversed, so that spatial patterns in the distribution and relative abundance of shorebirds could be mapped to a 1 km spatial resolution.

When surveying the coastline by boat, several observers travelled along the coast in a small boat at a speed of approximately five knots, recording the identity and numbers of all bird species seen and heard on the island or flying offshore. The survey vessel typically traversed the coastline at a distance of 50 m - 100 m offshore, however this distance was occasionally extended to up to 200 m, in order to avoid navigational hazards such as submerged rocks.

In addition to counting all birds that were detected, the locations of any active nests or nesting colonies, and any dependent chicks or recently fledged young encountered along the coastline were also recorded using handheld GPS devices.

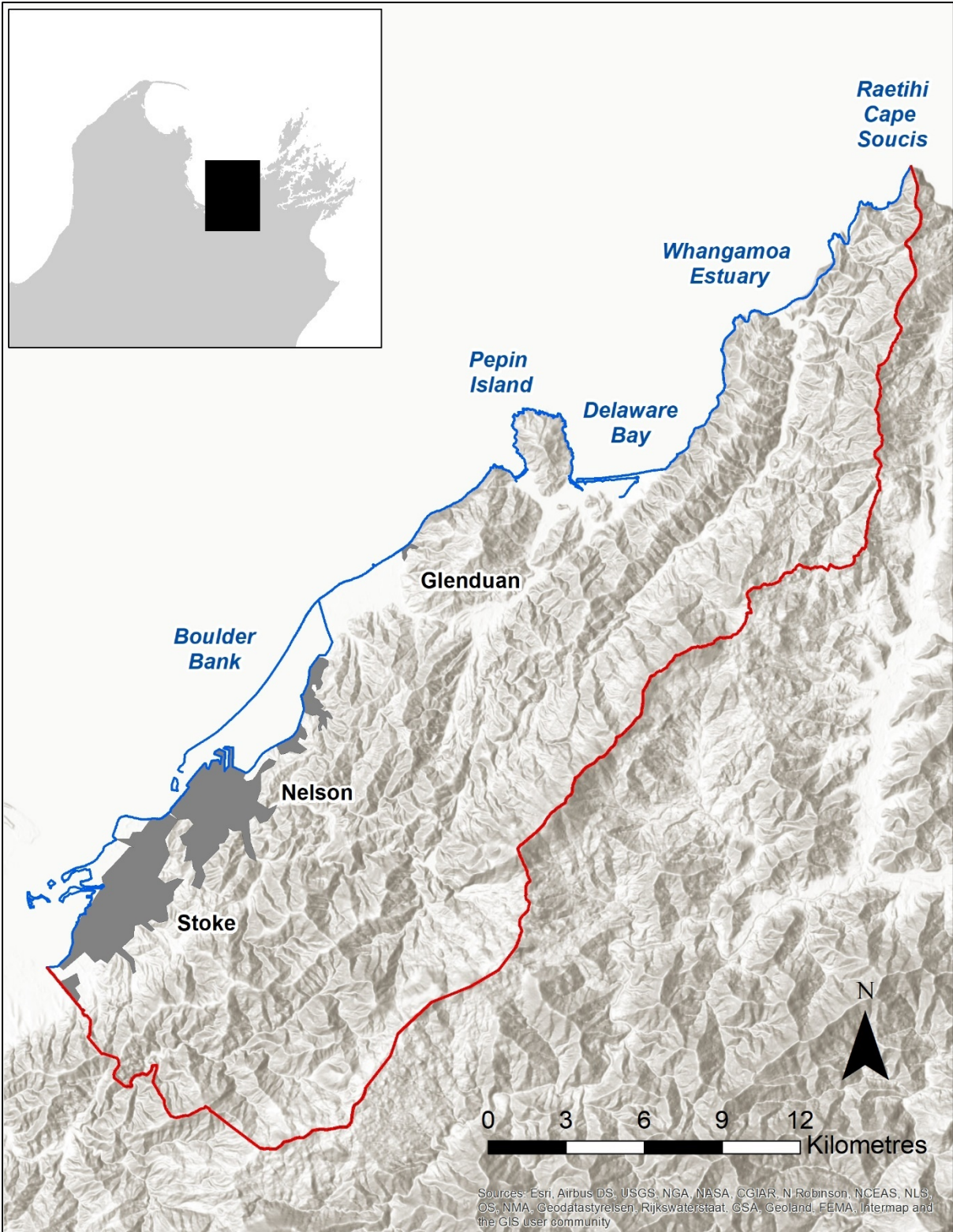


Figure 2.1: Extent of the Nelson City coastline surveyed in December 2020 (blue line). The Nelson City boundary is shown in red.

## 2.3 Data analysis

These survey data were double-entered into a Microsoft Excel™ spreadsheet for two-pass data verification, and the verified dataset was then used to calculate total and mean bird counts for individual survey sections and for the entire region. Raw bird count data was also imported into ArcMap version 10.8.1, which was then used to construct the bird distribution maps included in this report.

A copy of the Microsoft Excel™ data spreadsheet containing these survey data, together with scanned copies of the field datasheets, have been provided to Nelson City Council. A copy of this dataset has also been uploaded to the [New Zealand eBird](#) database, an open-access bird observation database jointly maintained by [Birds New Zealand](#) and the [Cornell Lab of Ornithology](#).

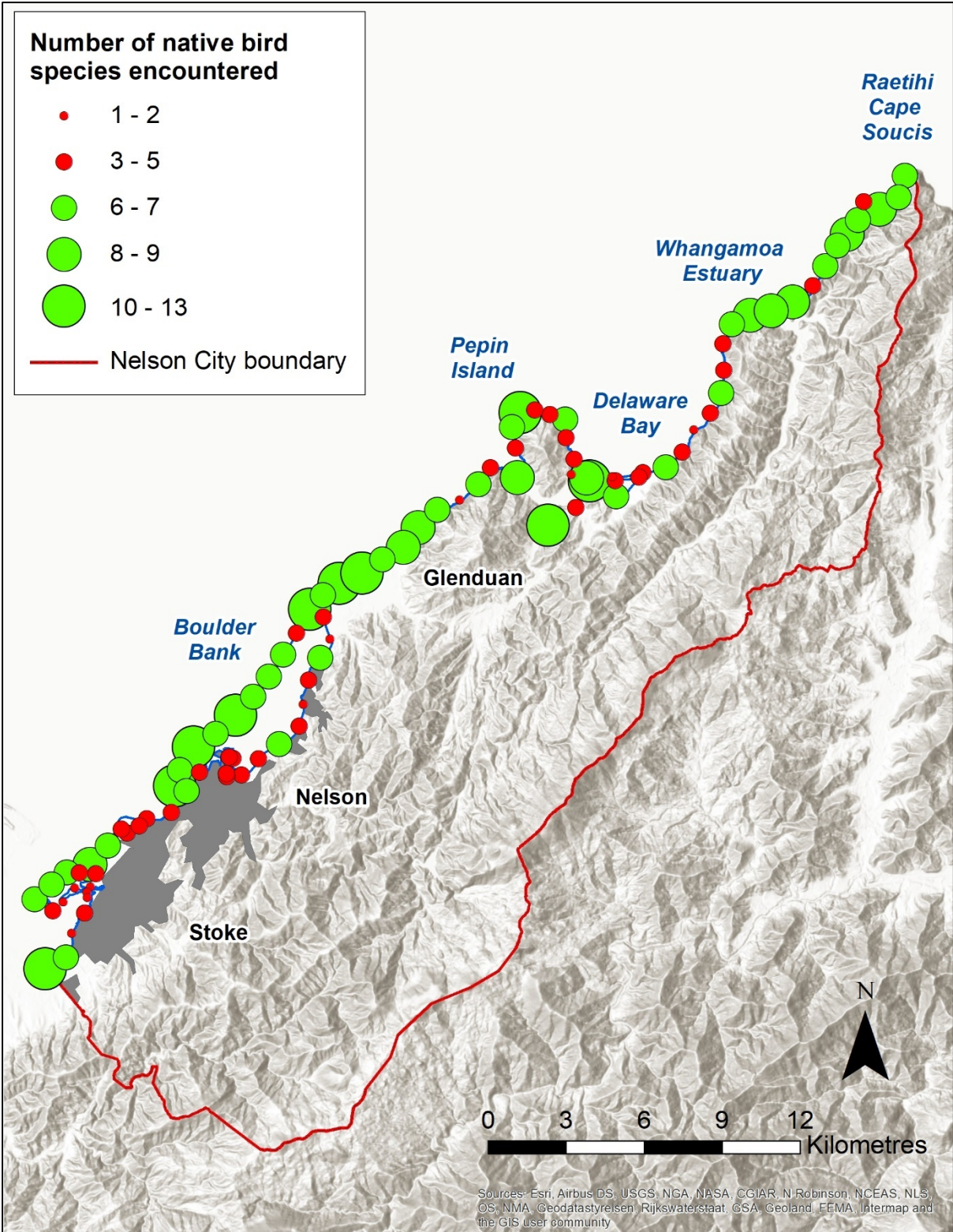
## 3. Results

### 3.1 Spatial patterns in species diversity

Fifty bird species and 4,109 individual birds were recorded during this survey of the Nelson City coastline. 35 of these species (70%) are native to New Zealand and the remaining 15 species (30%) are introduced and naturalised species (Appendix One). This level of indigenous dominance is similar to that recorded along other parts of the central New Zealand coastline. For example, 74% of the 69 bird species recorded along 460 km of the Wellington region coastline surveyed in 2017-2018 were native species (McArthur et al, 2019) and 72% of the 79 bird species recorded along 321 km of the Hawke's Bay coastline surveyed in 2021 were native species (McArthur et al, 2021a).

Sixteen of the bird species detected along the Nelson City coastline (32%) are ranked as either Nationally Threatened or At Risk under the New Zealand Threat Classification System, including one species ranked as Nationally Critical (tarāpuka / black-billed gull, *Larus bulleri*); two species ranked as Nationally Endangered (kawau pāteketeke / king shag, *Leucocarbo carunculatus* and matuku moana / reef heron, *Egretta sacra*); three species ranked as Nationally Vulnerable (tuanui / flesh-footed shearwater, *Puffinus carneipes*; pohowera / banded dotterel, *Charadrius bicinctus* and taranui / Caspian tern, *Hydroprogne caspia*); four species ranked as At Risk, Declining (kuaka / bar-tailed godwit, *Limosa lapponica*; tōrea / South Island pied oystercatcher, *Haematopus finschi*; tarāpunga / red-billed gull, *Larus novaehollandiae* and tara / white-fronted tern, *Sterna striata*); one species ranked as At Risk, Relict (pakahā / fluttering shearwater, *Puffinus gavia*); two species ranked as At Risk, Recovering (kāruhiruhi / pied shag, *Phalacrocorax varius* and tōrea pango / variable oystercatcher, *Haematopus unicolor*) and three species ranked as At Risk, Naturally Uncommon (kawau / black shag, *Phalacrocorax carbo*; kawau tūi / little black shag, *Phalacrocorax sulcirostris* and kotuku ngutupapa / royal spoonbill, *Platalea regia*) (Robertson et al, 2017; Appendix One). The proportion of bird species detected along the Nelson City coastline that are ranked as Nationally Threatened or At Risk is also similar to that recorded along other parts of the central New Zealand coastline. For example, 36% of the bird species detected along the Wellington coastline in 2017-2018 and 35% of the bird species detected along the Hawke's Bay coastline in 2021 are ranked as Nationally Threatened or At Risk under the New Zealand Threat Classification System (McArthur et al, 2019; McArthur et al, 2021a).

A mean of 5.6 native bird species was recorded per 1 km survey section along the Nelson City coastline, however local species diversity varied considerably between individual survey sections. Higher than average numbers of native bird species were recorded along the coastline between Whangamoa Estuary and Raetihi / Cape Soucis; the Glenduan coastline and the Nelson Boulder Bank; the coastline adjacent to Nelson Airport and on the small inshore islands including Haulashore, Saxton, Pig and Oyster Islands. These sections of coastline are all relatively unmodified, are likely to be experiencing relatively low rates of human disturbance and include bare gravel and rock habitats above MHWS that provide safe roosting and nesting habitats for species including oystercatchers, shags, gulls and terns. Sections of coastline adjacent to urban and suburban areas and major arterial routes such as SH6 generally supported lower than average numbers of native bird species, likely due to the fact that these sections of coastline tend to have been 'hardened' with rock revetment and other structures designed to reduce rates of coastal erosion and were experiencing higher rates of human disturbance (Figure 3.1).



**Figure 3.1: Spatial patterns in the species richness of indigenous bird species along the Nelson City coastline. Red dots represent 1 km coastal survey sections with below average numbers of indigenous bird species and green dots represent 1 km survey sections with above average numbers of indigenous bird species.**

## 3.2 Spatial patterns in species abundance

In the following sections of the report, we have mapped spatial patterns in the abundance of 15 of the 35 native bird species that were detected along the Nelson City coastline. These species have been chosen because they are entirely, or largely, restricted to coastal habitats within Nelson City limits. The majority of these species are also ranked as either Nationally Threatened or At Risk under the New Zealand Threat Classification System (Robertson et al, 2017). A full list of all of the bird species recorded during this survey can be found in Appendix One.

### 3.2.1 Pohowera / banded dotterel (*Charadrius bicinctus*)



Image courtesy of Rebecca Bowater/NZ Birds Online

#### **National conservation status:**

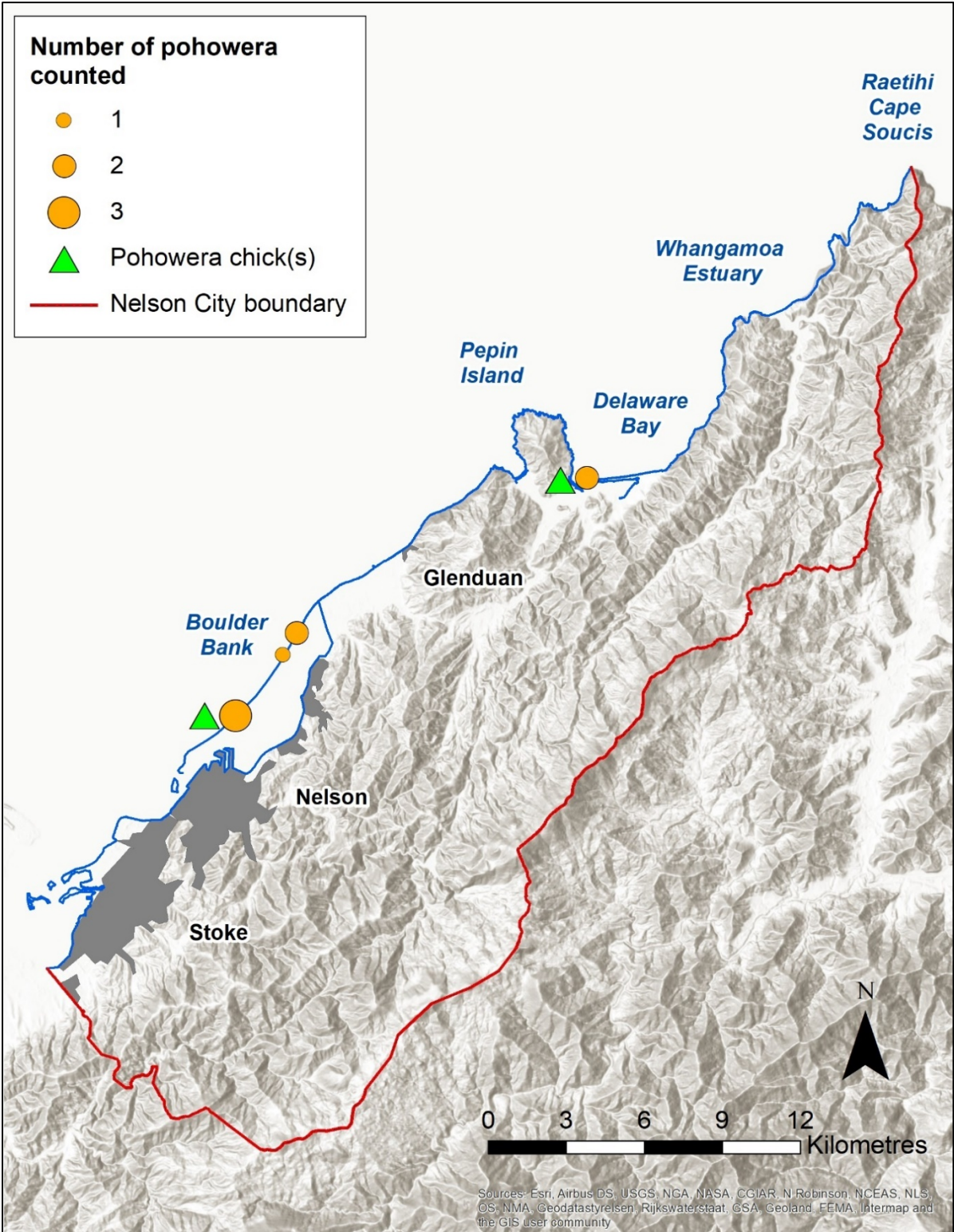
Nationally Vulnerable (Robertson et al, 2017)

Only eight adult pohowera / banded dotterels were counted during this survey, occupying 4 (4.1%) of the 97 1 km sections of coastline surveyed (Figure 3.2). Six adult birds were encountered along the Nelson Boulder Bank and two adults were encountered in Delaware Bay. Breeding was occurring in both locations, with a single chick observed on the Boulder Bank and two small chicks observed at Delaware Bay (Figure 3.2).

With a mean of 0.08 birds counted per km of coastline, pohowera / banded dotterels are comparatively scarce along the Nelson City coastline during the summer months compared to other stretches of coastline in central New Zealand. For example, a total of 346 pohowera / banded dotterels were counted along 460 km of coastline in the Wellington region in November-December 2017-2018 (0.75 birds/km) (McArthur et al, 2019) and 395 birds were counted along 321 km of coastline in the Hawke's Bay region in January 2021 (1.23 birds/km) (McArthur et al, 2021b). The reason for the scarcity of breeding pohowera / banded dotterels along the Nelson City coastline appears to be a shortage of suitable breeding habitat. In the Wellington and Hawke's Bay regions, coastal-breeding pohowera / banded dotterels show a clear preference for sections of coastline that have comparatively wide expanses of unvegetated gravel or sand, which typically occur at river mouths and on coastal headlands (McArthur et al, 2019; McArthur 2020a). In contrast, the majority of the Nelson City coastline consists of stony or boulder beaches, sheer cliffs or rocks, or sections of coastline that have been 'hardened' by the construction of rock revetment and seawalls to control coastal erosion. Given this, it is clear from this survey that the Nelson Boulder Bank and the Delaware Bay Sandspit are crucial habitats for breeding pohowera / banded dotterels along the Nelson City coastline, supporting 75% and 25% of Nelson City's breeding population respectively. Pohowera / banded dotterel numbers on the Nelson Boulder Bank and on Delaware Spit are also surprisingly low given the area of habitat available at these two sites however, indicated that additional local factors such as depredation by mammalian and/or avian predators and the flooding of nests may also have led to local declines at these otherwise suitable breeding sites.

Although the Nelson City coastline only supports a very small breeding population of pohowera / banded dotterels, it does provide habitat for larger numbers of non-breeding birds during the winter months. At least three sites along the Nelson City coastline provide important winter habitat pohowera / banded dotterels: the foreshore at the southern end of Nelson Airport supports a winter flock of up to 123 birds (Robertson, 2019); Nelson Haven supports a winter flock of up to 250 birds (Cannings, 2019) and Delaware Bay supports a winter flock of up to 20 birds (Davey, 2019). Given that it's possible that wintering flocks may move regularly between the Nelson Haven and Nelson Airport sites, we estimate that the Nelson City coastline supports an annual winter population of between 270 and 393 non-breeding pohowera / banded dotterels.

Given an estimated global pohowera / banded dotterel population of 19,000 birds (Hansen et al, 2016), the Nelson City coastline provides breeding habitat for only 0.04% of the global population of this species, but provides non-breeding habitat for between 1.4% and 2.1% of the global population. Applying this new Nelson City breeding population estimate of eight pohowera / banded dotterels to the regional New Zealand Threat Classification System criteria, we recommend that the pohowera / banded dotterel should be ranked as Regionally Critical in Nelson City based on criterion A(1): <250 mature individuals (Townsend et al, 2008; Crisp, 2020). We also recommend that this ranking be given the qualifiers CI (Climate Impacts) and DPT (Data Poor Trend) according to the qualifier definitions provided by Rolfe et al, (2021).



**Figure 3.2: Distribution and relative abundance of pohowera / banded dotterels along the Nelson City coastline (NB: the green triangle symbols on the map are offset to the left of the actual locations of nests, chicks and breeding colonies so that both breeding records and abundance data can be displayed on the same map).**



### 3.2.2 Kuaka / bar-tailed godwit (*Limosa lapponica*)



Image courtesy of Phil Battley/NZ Birds Online

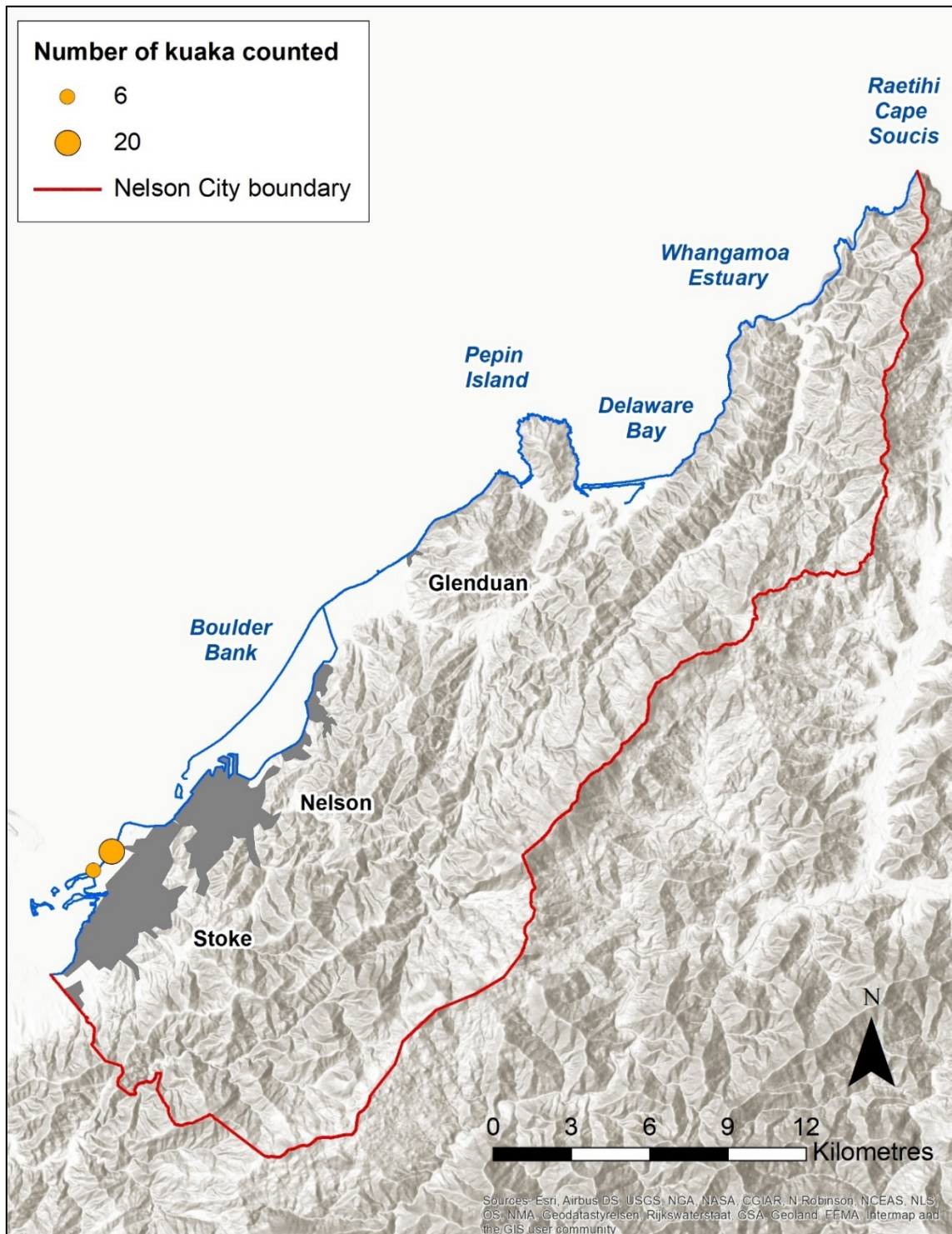
**National conservation status:** At Risk, Declining (Robertson et al, 2017)

Twenty-six kuaka / bar-tailed godwits were counted during this survey, occupying two (2.1%) of the 97 1 km sections of coastline surveyed (Figure 3.3). Twenty kuaka / bar-tailed godwits were encountered at the Tahunanui Back Beach and a further six birds were encountered on the foreshore adjacent to Nelson Airport.

The vast majority of the kuaka / bar-tailed godwits that visit New Zealand each summer breed in Alaska and undertake a remarkable non-stop, trans-Pacific migration to spend the southern hemisphere summer at coastal sites in eastern Australia and New Zealand. On their return northward migration, these birds reach Alaska via stop-over sites in eastern Asia, particularly the estuaries of the Yellow Sea (Higgins & Davies 1996). Kuaka / bar-tailed godwits are the most common Arctic-breeding shorebird that occurs in New Zealand, however the number of birds visiting New Zealand each summer has declined by 6% since the early 1980s (Riegen & Sagar, 2020). Between 1983 and 1993 an average of 83,133 birds were counted during Birds New Zealand summer wader surveys each year, whereas an average of 77,796 birds were counted during surveys carried out between 2005 and 2019 (Riegen & Sagar 2020). Coastal mudflats on the shores of the Yellow Sea are an important stopover habitat for this species during migration, so it is likely that recent extensive losses of these habitats due to large-scale land reclamation projects in China and South Korea is the leading cause of the substantial decline observed in this species (Studds et al, 2017; Riegen & Sagar, 2020). The majority of the kuaka / bar-tailed godwits that occur in New Zealand each year are found on the harbours and estuaries of Northland, Auckland, the Bay of Plenty and in the Nelson-Tasman region, with relatively small numbers present in the lower North Island (Riegen & Sagar, 2020). In February 2020, the first dedicated census of kuaka / bar-tailed godwits to be carried out in Australasia resulted in 81,549 birds being counted in New Zealand and a further 34,897 birds were counted in Australia (Schuckard et al, 2020). Despite only 26 birds being counted during this survey, Birds New Zealand summer wader counts have demonstrated that that eastern Waimea Inlet is a nationally-significant habitat for kuaka / bar-tailed godwits, supporting a mean of 1,263 birds each summer between 2001 and 2012, (Schuckard & Melville, 2013). Within Waimea Inlet, these birds are highly mobile, moving freely around the inlet depending on the state of the tide and in response to disturbance. Kuaka / bar-tailed godwits are recorded regularly along the entire length of the eastern coastline of Waimea Inlet within Nelson City limits and in Nelson Haven, and are occasionally recorded in Delaware Bay (eBird, 2021).

Assuming that the entire summer population of kuaka / bar-tailed godwits in the eastern Waimea Inlet utilises the mudflats along the Nelson City foreshore and in Nelson Haven at varying times over the summer months, we estimate that Nelson City supports an average of 1,263 kuaka / bar-tailed godwits each summer, representing 15% of the New Zealand summer population and 11% of the Australasian summer population of this species (Schuckard & Melville, 2013; Schuckard et al, 2020). Applying this population estimate to the regional NZTCS criteria and assuming that the eastern Waimea Inlet

population is declining at a similar rate to the national population, we recommend that the kuaka / bar-tailed godwit should be ranked as Regionally Vulnerable in Nelson City based on criterion C(1/1): 1000-5000 mature individuals, predicted decline 10-50% (Townsend et al, 2008; Crisp, 2020). We also recommend that this ranking be given the qualifiers CI (Climate Impacts) and TO (Threatened Overseas) according to the qualifier definitions provided by Rolfe et al, (2021).



**Figure 3.3: Distribution and relative abundance of kuaka / bar-tailed godwits along the Nelson City coastline.**

### 3.2.3 Kawau / black shag (*Phalacrocorax carbo*)



Image courtesy of Ormond Torr/NZ Birds Online

#### **National conservation status:**

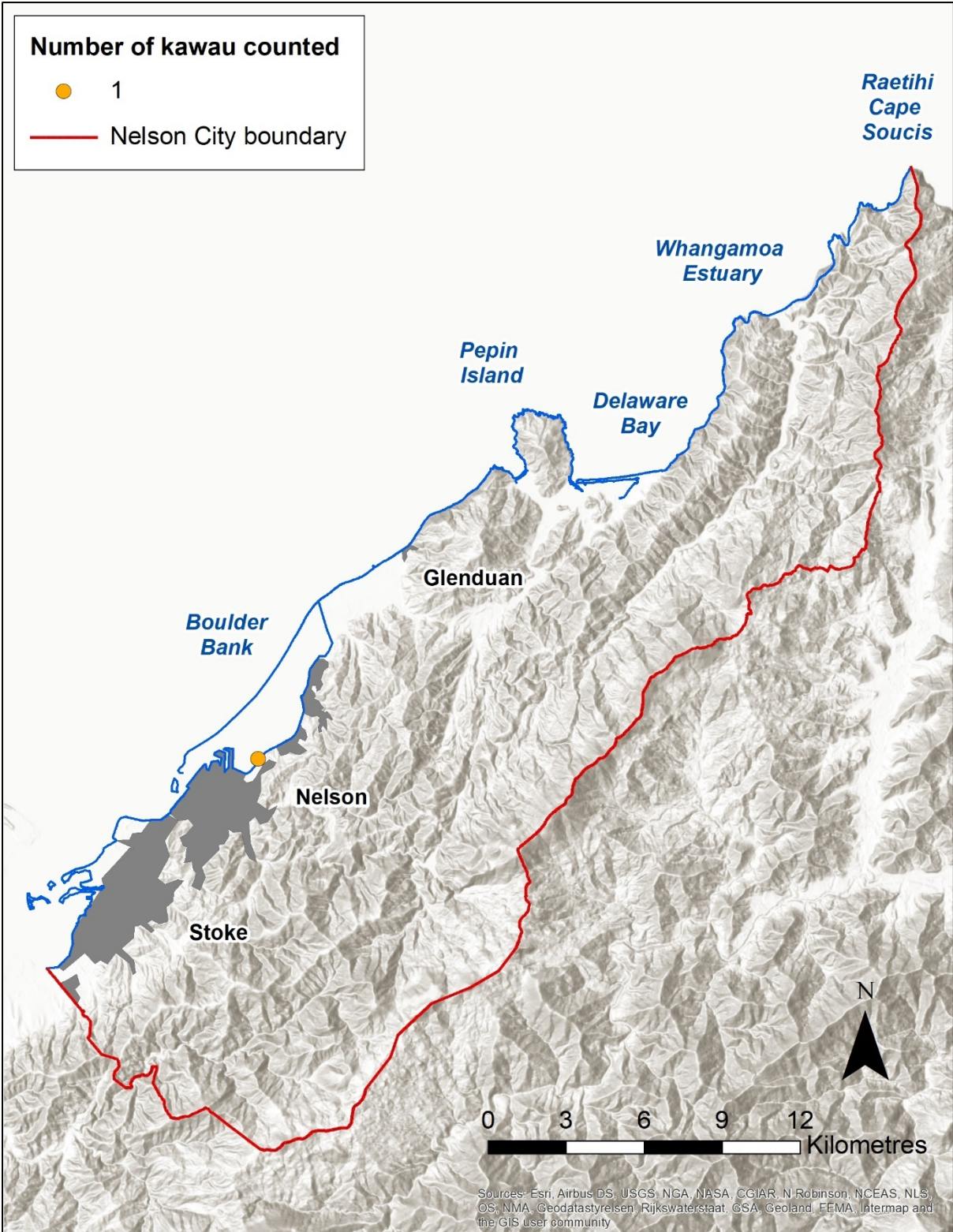
At Risk, Naturally Uncommon (Robertson et al, 2017)

Only a single kawau / black shag was counted during this survey, roosting on the south-eastern shoreline of Nelson Haven (Figure 3.4). Kawau / black shags are occasionally recorded along the length of the Nelson City coastline however, as well as in freshwater habitats including the Matai River and Wakapuaka settling ponds (eBird, 2021).

With a mean of just 0.01 birds counted per km of coastline during this survey, kawau / black shags were comparatively scarce along the Nelson City coastline compared to other stretches of coastline in central New

Zealand. For example, a total of 148 kawau / black shags were counted along 460 km of coastline in the Wellington region in November-December 2017-2018 (0.32 birds/km) (McArthur et al, 2019) and 500 birds were counted along 321 km of coastline in the Hawke's Bay region in January 2021 (1.56 birds/km) (McArthur et al, 2021b). In all three regions, the distribution of kawau / black shags and kāruhiruhi / pied shags (*Phalacrocorax varius*) are almost completely mutually exclusive, suggesting that kāruhiruhi / pied shags may displace kawau / black shags from coastal habitats as a result of some form of competitive exclusion between these two species. Kāruhiruhi / pied shags are comparatively common and widespread along the Nelson City coastline (Figure 3.11), whereas they have only recently re-colonised the Wellington and Hawke's Bay region coastlines. In the Wellington region, kāruhiruhi / pied shags are similarly common and widespread along the western Wellington coastline, but are still absent from the Wairarapa coast, whereas kawau / black shags are comparatively rare on the west coast, but much commoner on the Wairarapa coast (McArthur et al, 2019). Similarly, in the Hawke's Bay region kāruhiruhi / pied shags are now common and widespread on Mahia Peninsula but are largely absent from the remainder of the Hawke's Bay coastline, whereas kawau / black shags are relatively common along the majority of the Hawke's Bay coastline, with the exception of Mahia Peninsula (McArthur et al, 2021b).

In Nelson City, kawau / black shags are known to occupy a range of habitats including the coastline, rivers, freshwater wetlands, lakes and ponds (eBird, 2021). Given this widespread and sparse distribution, it's difficult to generate a population estimate for this species for Nelson City, however kawau / black shag observations submitted to the New Zealand eBird database indicate that the Nelson City population is likely to be well below 250 mature individuals. Applying a population estimate of <250 adult birds in Nelson City to the regional New Zealand Threat Classification System criteria and assuming a stable population, we recommend that this species should be ranked as Regionally Critical based on criterion A(1): <250 mature individuals (Townsend et al, 2008; Crisp, 2020). We also recommend that this ranking be given the qualifiers DPS (Data Poor Size), DPT (Data Poor Trend), Sp (Biologically Sparse) and SO (Secure Overseas) according to the qualifier definitions provided by Rolfe et al, (2021).



**Figure 3.4: Distribution and relative abundance of kawau / black shags along the Nelson City coastline.**

### 3.2.4 Tarāpuka / black-billed gull (*Larus bulleri*)



Image courtesy of Steve Attwood/NZ Birds Online

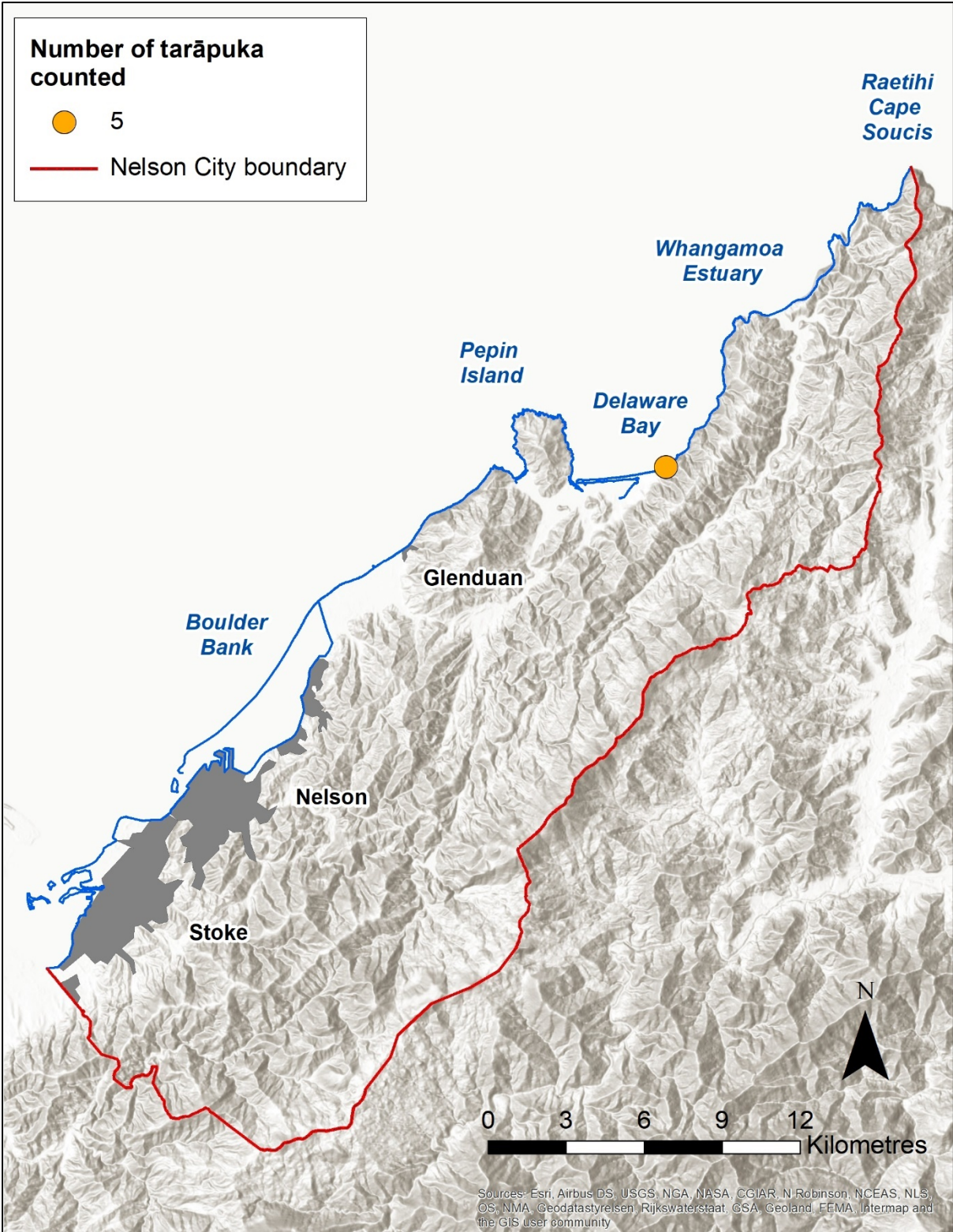
**National conservation status:** Nationally Critical (Robertson et al, 2017)

Five tarāpuka / black-billed gulls were counted during this survey, all of which were encountered in a single 1 km survey section in Delaware Bay (Figure 3.5). Tarāpuka / black-billed gulls are also regularly recorded in small numbers along the eastern shoreline of Waimea Inlet, in Nelson Haven, in the Nelson CBD and at the Wakapuaka settling ponds (eBird, 2021). While some of these birds may be breeding at colonies situated along the Tasman District coastline, re-sightings of

colour-banded birds have confirmed that at least some of the birds present along the Nelson City coastline breed at colonies on the Wairau River in Marlborough (McArthur, 2018). Tarāpuka / black-billed gulls have previously nested on Sand Island in Waimea Inlet, however this site has now largely eroded away (Schuckard & Melville, 2019). No nesting colonies were detected along the Nelson City coastline during this survey.

Numbers of tarāpuka / black-billed gulls occurring within Nelson City limits is likely to vary considerably during the year, however records submitted to the New Zealand eBird database indicate that the local population is unlikely to exceed 100-200 birds at any given time. For instance, the single largest count of tarāpuka / black-billed gulls submitted to the New Zealand eBird database to date is of 33 birds (included four banded birds that had hatched at colonies on the Wairau River) observed at the Wakapuaka settling ponds on the 6<sup>th</sup> of January 2018 (McArthur, 2018). With an estimated national population of 120,512 breeding birds (Mischler, 2018), the 100-200 birds that typically occur within Nelson City limits represents just 0.08 - 0.16% of the national tarāpuka / black-billed gull population.

Applying a population estimate of 100-200 (non-breeding) tarāpuka / black-billed gulls in Nelson City to the regional New Zealand Threat Classification System criteria, we recommend that this species should be ranked as a Migrant in Nelson City, based on the criterion that the tarāpuka / black-billed gull is a taxon that “predictably visit[s] Nelson City seasonally as part of [its] normal life cycle (a minimum of 15 individuals known or presumed to visit per annum) but [does] not breed here” (Townsend et al, 2008; Crisp et al, 2020). We recommend that this ranking be given the qualifier CI (Climate Impacts) according to the qualifier definitions provided by Rolfe et al, (2021).



**Figure 3.5: Distribution and relative abundance of tarāpuka / black-billed gulls along the Nelson City coastline.**

### 3.2.5 Taranui / Caspian tern (*Hydroprogne caspia*)



Image courtesy of Les Feasey/NZ Birds Online

#### **National conservation status:**

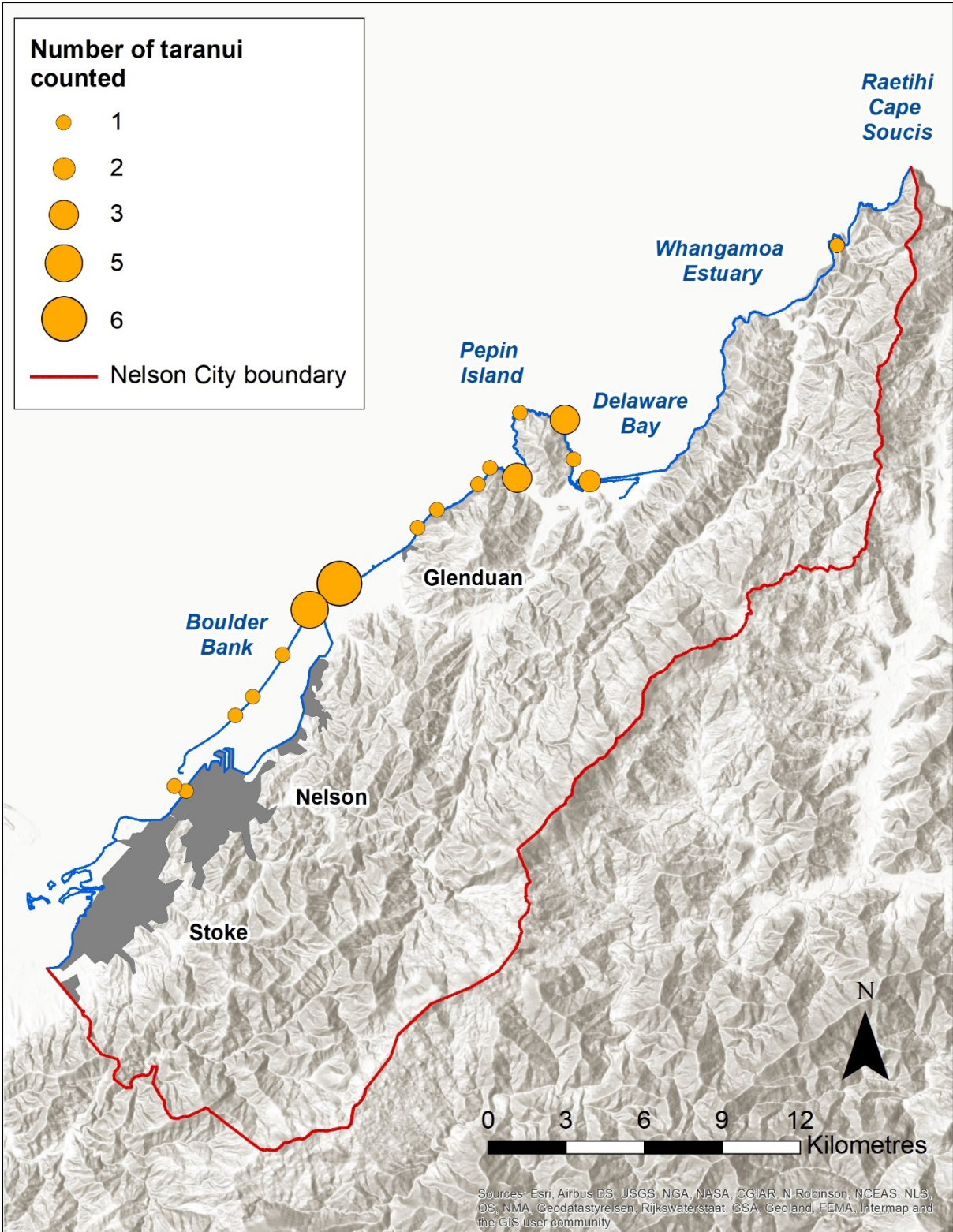
Nationally Vulnerable (Robertson et al, 2017)

A total of 31 adult taranui / Caspian terns were counted during this survey, occupying 17 (17.5%) of the 97 1 km sections of coastline surveyed (Figure 3.6). Taranui / Caspian terns were fairly uniformly distributed along the Nelson City coastline between Haulashore Island and Delaware Bay, with a particular hotspot of occurrence at the base of the Nelson Boulder Bank and Wakapuaka settling ponds. Although no taranui / Caspian terns were found

to be breeding within Nelson City limits, a breeding colony was present on a shellbank at Bell Island in eastern Waimea Inlet. 82 adults and 30 chicks were counted at this colony on the 11<sup>th</sup> of December 2020 (McArthur et al, 2021a), and 16 of these chicks were caught and banded on the 16<sup>th</sup> of December 2020 (Quayle, 2021). A second nesting colony was also present on a shellbank at Rototai, near the mouth of the Takaka River, where 73 adults and 31 chicks were counted on the 12<sup>th</sup> of December 2020 (McArthur et al, 2021a). It is likely that many of the Caspian terns that were recorded along the Nelson City coastline during this survey were locally-breeding birds from these two nearby colonies.

Taranui / Caspian terns are a cosmopolitan species that is sparsely distributed throughout Eurasia, Africa, Australasia and North and Central America (Higgins & Davies, 1996). In New Zealand, taranui / Caspian terns are widespread around the mainland coastline, and are regularly encountered well inland on larger rivers, lakes and hydroelectric dams (Heather & Robertson, 2015; eBird, 2021). Taranui / Caspian terns have nested regularly at Bell Island since at least the early 1990s, and at Rototai since at least the early 1970s (Bell & Bell, 2008), and these were two of only six known nesting colonies in the South Island during the 2020-2021 breeding season (Eagles, 2021). With an estimated national population of between 2600-2800 breeding adults (Bell & Bell, 2008), the 155 adult taranui / Caspian terns counted at the Bell Island and Rototai nesting colonies in December 2020 represents 5.5 – 5.9% of the national population of this species.

Assuming that the 31 birds recorded along the Nelson City coastline are likely to be local breeders (and acknowledging that some individuals may have been double-counted), it's therefore likely that the Nelson City coastline provides both foraging and roosting habitat for an estimated breeding population of 82 – 155 taranui / Caspian terns, irrespective of the fact that these birds are breeding beyond Nelson City limits. Applying a population estimate of ≤155 breeding taranui / Caspian terns in Nelson City to the regional New Zealand Threat Classification System criteria and assuming a stable population, we recommend that the taranui / Caspian tern should be ranked as Regionally Critical in Nelson City based on criterion A(1): <250 mature individuals (Townsend et al, 2008; Crisp, 2020). We recommend that this ranking be given the qualifiers Sp (Biologically Sparse), CI (Climate Impacts) and SO (Secure Overseas) according to the qualifier definitions provided by Rolfe et al, (2021).



**Figure 3.6: Distribution and relative abundance of taranui / Caspian terns along the Nelson City coastline.**



### 3.2.6 Kawau pāteketeke / King shag (*Leucocarbo carunculatus*)



Image courtesy of Oscar Thomas/NZ Birds Online

#### **National conservation status:**

Nationally Endangered (Robertson et al, 2017)

A total of 22 kawau pāteketeke / king shags were counted during this survey, occupying 4 (4.1%) of the 97 1 km sections of coastline surveyed (Figure 3.9). Individual birds were observed swimming offshore near Cape Soucis and the Whangamoā Estuary, and a third individual was observed roosting on the foreshore near Glenduan. A further flock of 19 birds was found roosting on rock stack near the

Whangamoā Estuary (Figure 3.7), including a first-year bird that had been caught and colour-banded as a chick at a breeding colony on Kuru Pongi / North Trio (50 km to the North-east) in July 2019 (Figure 3.8; M. Bell, *personal communication*).

These observations are of high significance, as they appear to represent the first confirmed observations of kawau pāteketeke / king shags along the Nelson City coastline, and the first time that a roosting flock has been observed outside of this species' core range in the Marlborough Sounds. Several observations of 1-2 kawau pāteketeke / king shags have been made along the Tasman District Coastline between Kaitereterē and Tonga Island since 2015 (Schuckard & Melville, 2019) and another bird was observed in "Tasman Bay" on the 17<sup>th</sup> of November 2018 (Nevin, 2018). Three further individuals have since been observed within the Nelson City coastal marine area during the first half of 2021, all of which have been observed between Delaware Bay and Cape Soucis (Ayre, 2021; Ray, 2021). The detection of such a significant number of kawau pāteketeke / king shags along the Nelson City coastline during this survey, combined with three further observations during the first half of 2021 suggests that the kawau pāteketeke / king shag may be undergoing a minor range expansion southwards into the Nelson City coastal marine area.

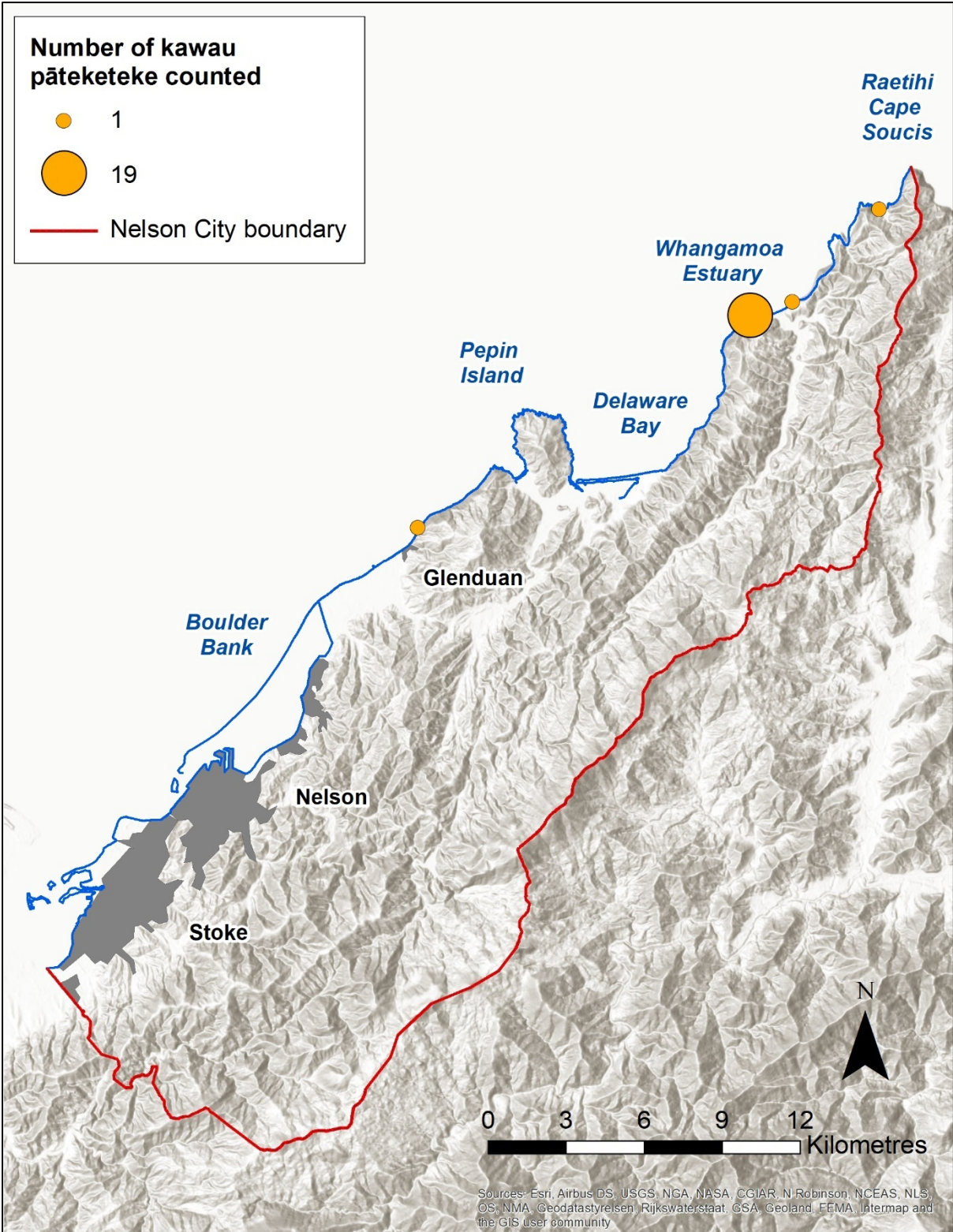
With an estimated global population of 839 birds (Schuckard et al, 2015), the 22 kawau pāteketeke / king shags counted during this survey represent 2.6% of the global population. Applying a population estimate of 22 kawau pāteketeke / king shags within Nelson City limits to the regional New Zealand Threat Classification System criteria, we recommend that this species be ranked as Regionally Critical in Nelson City based on criterion A(1): <250 mature individuals (Townsend et al, 2008; Crisp, 2020). We also recommend that this ranking be given the qualifiers CI (Climate Impacts) CD (Conservation Dependent) and RR (Range Restricted) according to the qualifier definitions provided by Rolfe et al, (2021).



**Figure 3.7:** Part of a flock of 19 kawau pāteketeke / king shags observed roosting on a rock stack near Whangamoā Estuary. In this image there are nine adult and two first-year kawau pāteketeke / king shags, and four kawau tikitiki / spotted shags. One of the two first-year kawau pāteketeke / king shags in this image had been banded as a chick at Kuru Pongi / North Trio in July 2019. This is the first kawau pāteketeke / king shag roost site that has ever been recorded in the Nelson City Coastal Marine Area. Image credit: David Thomas.



**Figure 3.8:** A colour-banded first-year kawau pāteketeke / king shag photographed on a rock stack near the Whangamoā Estuary. This bird had been banded as a chick at Kuru Pongi / North Trio, 50 km to the northeast, in July 2019. Image credit: David Thomas.



**Figure 3.9: Distribution and relative abundance of kawau pāteketeke / king shags along the Nelson City coastline.**

### 3.2.7 Kawau paka / little shag (*Phalacrocorax melanoleucos*)

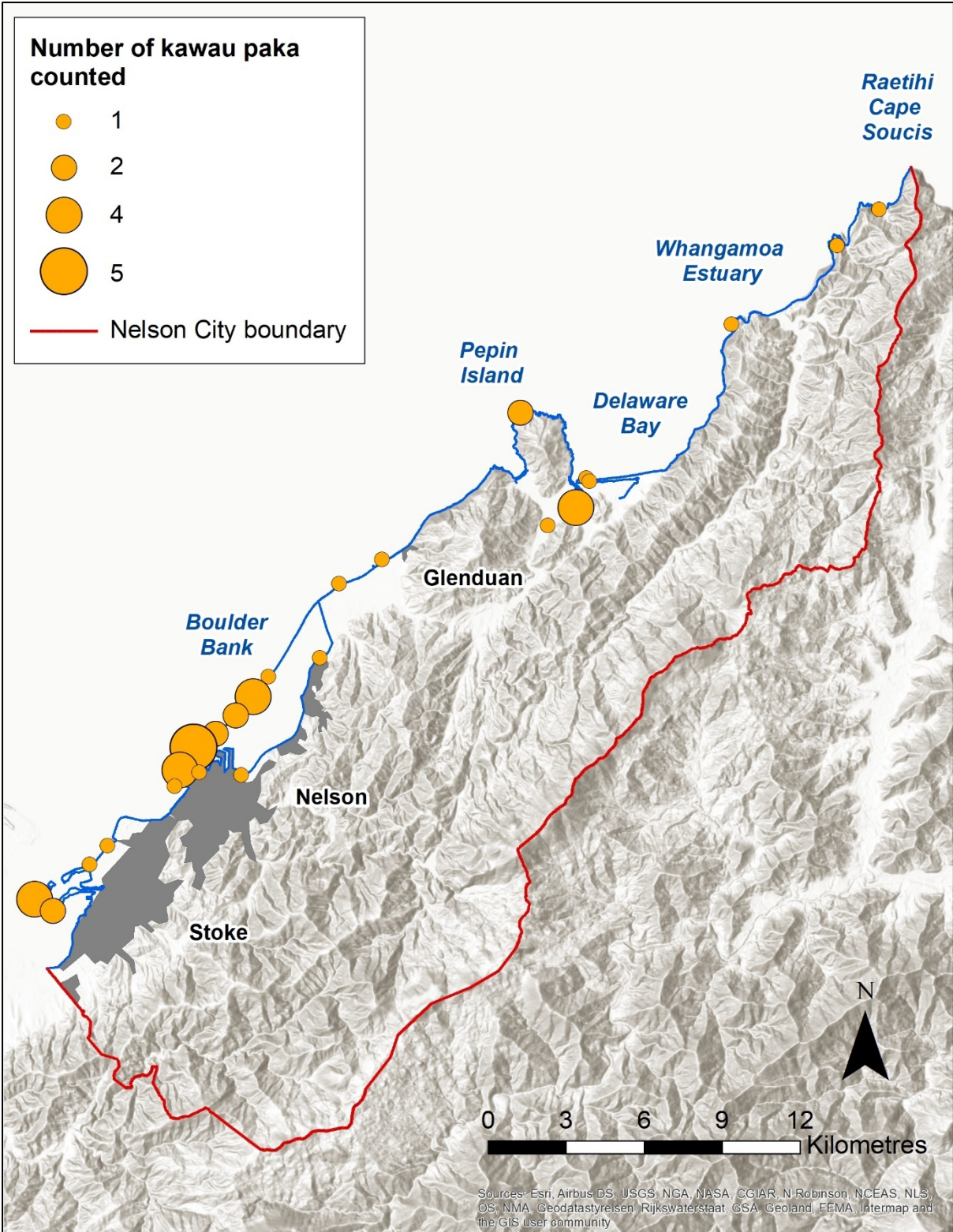


**National conservation status:** Not Threatened  
(Robertson et al, 2017)

A total of 44 kawau paka / little shags were counted during this survey, occupying 24 (24.7%) of the 97 1 km sections of coastline surveyed (Figure 3.10). Kawau paka / little shags were sparsely distributed along the entire Nelson City coastline, but were particularly common in Delaware Bay, on the Nelson Boulder Bank and on Haulashore, Saxton and Pig islands (Figure 3.10). No nesting colonies were located along the Nelson City coastline during this survey.

Kawau paka / little shags are known to occupy a range of habitats including the coastline, rivers, freshwater wetlands, lakes and ponds (Heather & Robertson, 2015; eBird, 2021). Suitable inland habitats are relatively scarce however, suggesting that the majority of kawau paka / little shags present within Nelson City limits will be occupying coastal habitats traversed during this survey. Given the apparent absence of nesting colonies along this coast, the majority of the birds recorded during this survey must breed at colonies situated in the Tasman District or further afield.

Applying a population estimate of 44 kawau paka / little shags to the regional New Zealand Threat Classification System criteria and given the absence of local nesting colonies, we recommend that this species should be ranked as a Migrant in Nelson City based on the criterion that the kawau paka / little shag is a taxon that “predictably visit[s] Nelson City seasonally as part of [its] normal life cycle (a minimum of 15 individuals known or presumed to visit per annum) but [does] not breed here” (Townsend et al, 2008; Crisp, 2020). We recommend that this ranking be given the qualifier DPT (Data Poor Trend) according to the qualifier definitions provided by Rolfe et al, (2021).



**Figure 3.10: Distribution and relative abundance of kawau paka / little shags along the Nelson City coastline.**

### 3.2.8 Kāruhiruhi / pied shag (*Phalacrocorax varius*)



Image courtesy of Peter Reese/NZ Birds Online

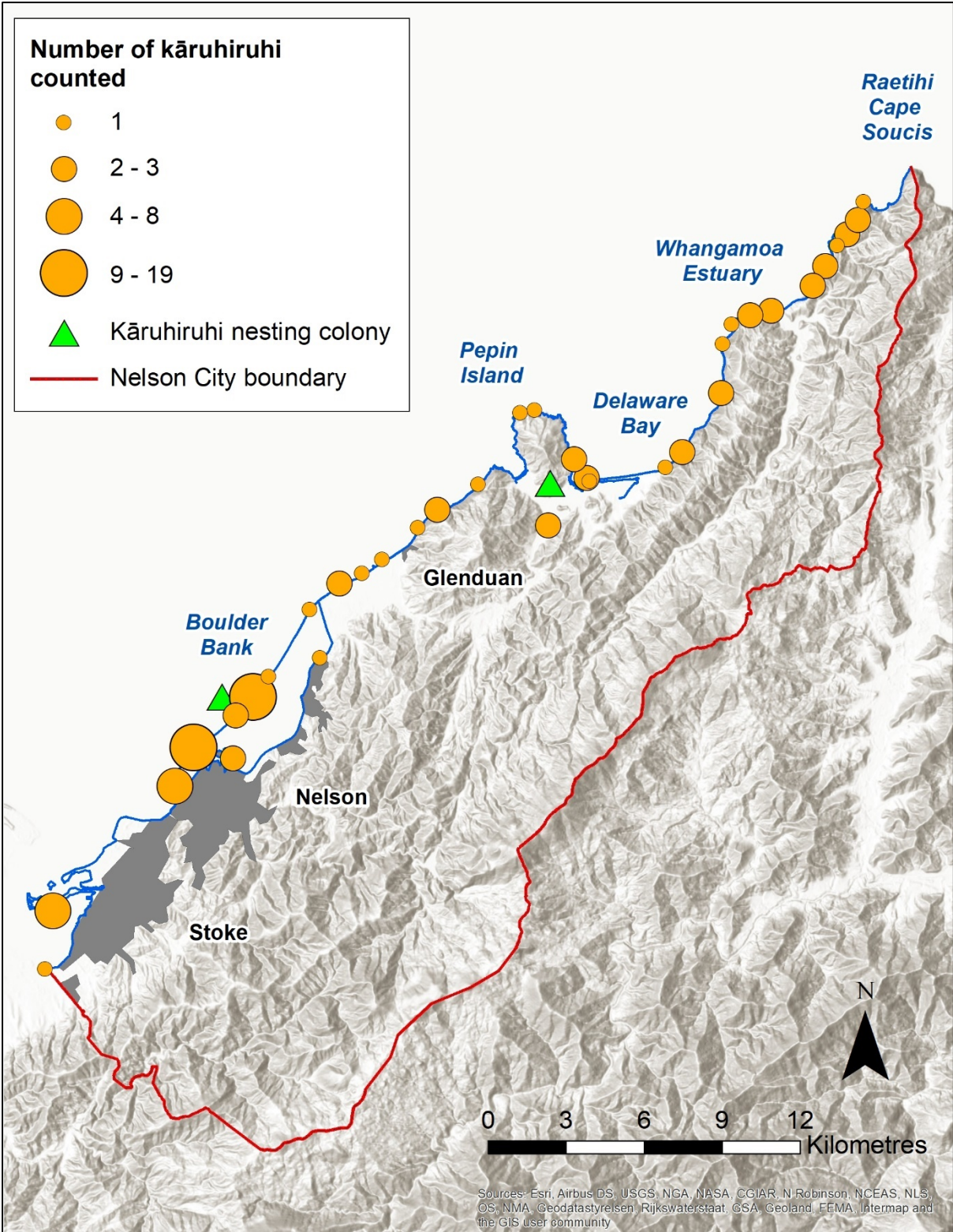
**National conservation status:** At Risk, Recovering (Robertson et al, 2017)

A total of 101 kāruhiruhi / pied shags were counted during this survey, occupying 35 (36.1%) of the 97 1 km sections of coastline surveyed (Figure 3.11). Kāruhiruhi / pied shags fairly uniformly distributed along the Nelson City coastline, with hotspots of abundance occurring on the Nelson Boulder Bank and on Haulashore and Pig Islands. Two small nesting colonies were located during this survey, one on the Boulder

Bank with two occupied nests and 19 adults present, and a second vacant colony on the Delaware Bay sandspit (Figure 3.11). Kāruhiruhi / pied shags are also known to nest in mature pine trees on Haulashore Island, with up to 79 nests and 300 adult birds recorded on the island in 1991 (Hawkins & Heinekamp, 1992). Numbers of birds using the island appear to have been substantially lower in recent years (eBird, 2021) and no occupied nests were recorded on the island during this survey.

Kāruhiruhi / pied shags have a disjunct distribution in New Zealand, with a southern breeding population in the southern South Island and Stewart Island, a central breeding population in the northern South Island and Wellington, and a northern breeding population in Northland, Auckland, Bay of Plenty, East Cape and northern Hawke's Bay (Robertson et al, 2007; Bell, 2013). In recent years, the northern breeding population has been extending southwards into Hawke's Bay (McArthur et al, 2021b) and the central breeding population has expanded north-eastwards up the Kāpiti Coast and into the Wairarapa (McArthur et al, 2019). In both Hawke's Bay and Wellington, kāruhiruhi / pied shags and kawau / black shags have almost mutually-exclusive coastal distributions, suggesting that kāruhiruhi / pied shags may be displacing kawau / black shags from coastal habitats in these regions as a result of some form of competitive exclusion between these two species (McArthur et al, 2019; McArthur et al, 2021b). Along the Nelson City coastline, kāruhiruhi / pied shags are relatively common and widespread, whereas kawau / black shags are very scarce (Figure 3.4), suggesting that the former species may be displacing the latter from coastal habitats in Nelson City as well.

Given that only two small nesting colonies were located along the Nelson City coastline during this survey, it's likely that the majority of the 101 kāruhiruhi / pied shags counted during this survey are birds that breed either along the Tasman District coastline or in the Marlborough Sounds, and use the Nelson City coastline for foraging and roosting. Given that the number of kāruhiruhi / pied shags breeding within Nelson City limits is likely to be well below 250 individuals, by applying this population estimate to the regional New Zealand Threat Classification System criteria, we recommend that this species should be ranked as Regionally Critical in Nelson City based on criterion A(1): <250 mature individuals (Townsend et al, 2008; Crisp, 2020). We also recommend that this ranking be given the qualifiers DPT (Data poor trend) and CR (Conservation research needed) according to the qualifier definitions provided by Rolfe et al, (2021).



**Figure 3.11: Distribution and relative abundance of kāruhiruhi / pied shags along the Nelson City coastline (NB: the green triangle symbols on the map are offset to the left of the actual locations of nests, chicks and breeding colonies so that both breeding records and abundance data can be displayed on the same map).**

### 3.2.9 Poaka / pied stilt (*Himantopus himantopus*)



Image courtesy of Tony Whitehead/NZ Birds Online

#### **National conservation status:**

Not Threatened (Robertson et al, 2017)

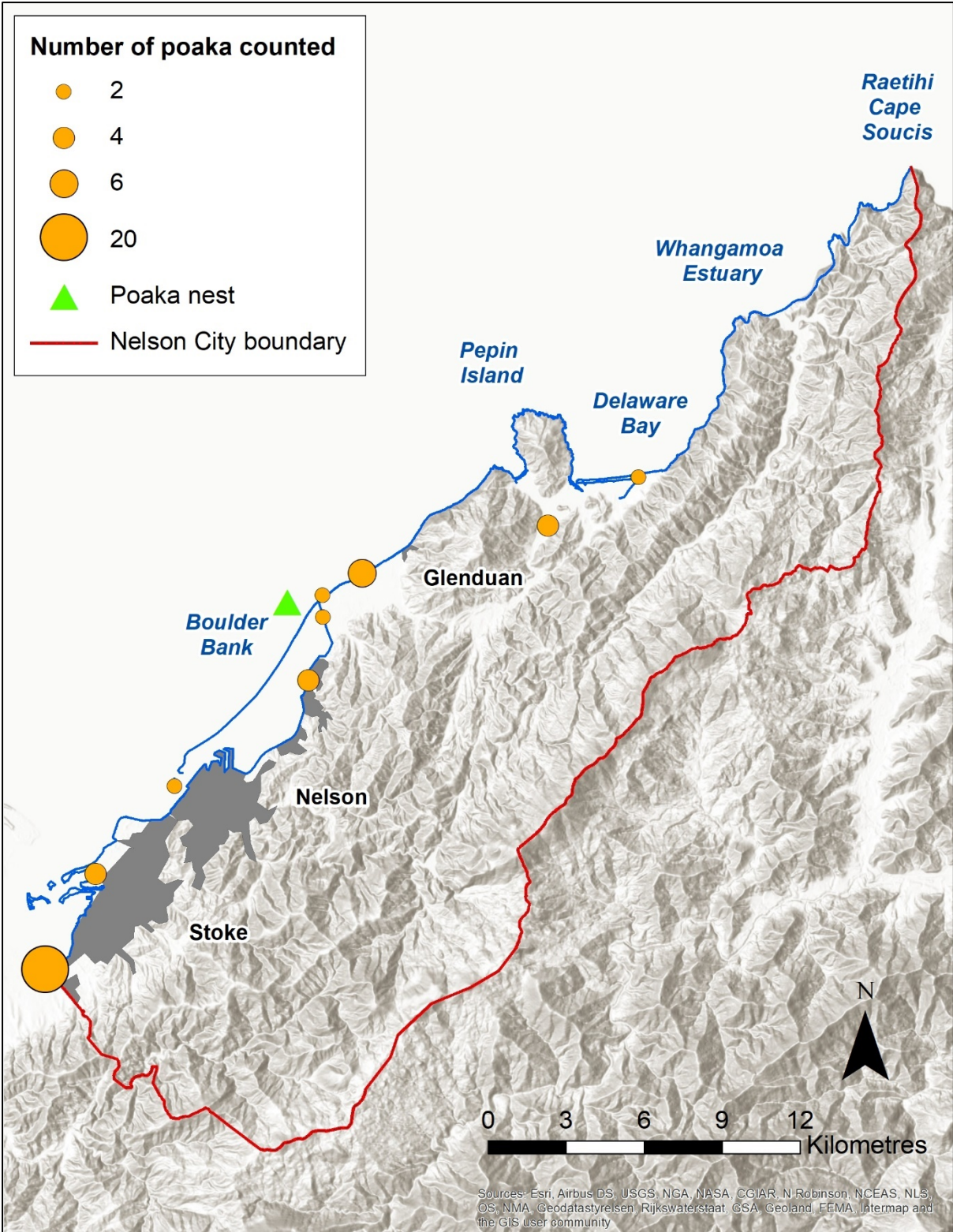
A total of 46 adult poaka / pied stilts were counted during this survey, occupying 9 (9.3%) of the 97 1 km sections of coastline surveyed (Figure 3.12). Almost half of the birds were encountered at the Saxton Creek outlet near Richmond, with the remaining birds sparsely distributed throughout Nelson Haven, along the Nelson Airport foreshore and in Delaware Bay. Interestingly, a single pair was also encountered in a small wetland area on

Haulashore Island. A single poaka / pied stilt nest was also located near the base of the Nelson Boulder Bank (Figure 3.12).

Although pied stilts are known to breed in a range of inland habitats including on riverbeds, in freshwater wetlands, on the shores of freshwater lakes and irrigation dams, and in flat, poorly drained paddocks (Heather & Robertson, 2015; eBird, 2021), the scarcity of these habitats within Nelson City limits suggests that the majority of poaka / pied stilts breeding in Nelson City will be occupying coastal habitats that were traversed during this survey. Given an estimated national population of 24,000 birds (Riegen and Sagar, 2020), the 46 birds recorded during this survey represents 0.2% of the national population of this species.

Applying a population estimate of 46 poaka / pied stilts to the regional New Zealand Threat Classification System criteria, and assuming a stable population, we recommend that this species should be ranked as Regionally Critical in Nelson City based on criterion A(1): <250 mature individuals (Townsend et al, 2008; Crisp, 2020). We also recommend that this ranking be given the qualifiers DPT (Data Poor Trend), CI (Climate Impacts) and SO (Secure Overseas) according to the qualifier definitions provided by Rolfe et al, (2021).





**Figure 3.12: Distribution, relative abundance and breeding observations of poaka / pied stilts along the Nelson City coastline (NB: the green triangle symbols on the map are offset to the left of the actual locations of nests, chicks and breeding colonies so that both breeding records and abundance data can be displayed on the same map).**

### 3.2.10 Tarāpunga / red-billed gull (*Larus novaehollandiae*)



Image courtesy of Alan Tennyson/NZ Birds Online

**National conservation status:** At Risk, Declining  
(Robertson et al, 2017)

A total of 1,860 tarāpunga / red-billed gulls were counted during this survey, occupying 74 (76.3%) of the 97 1 km sections of coastline surveyed (Figure 3.13). Tarāpunga / red-billed gulls were fairly uniformly distributed along the entire Nelson City coastline, with local concentrations of birds at two breeding colonies, one at the southern tip of the Nelson Boulder Bank, and the other on cliffs near Cape Soucis (Figure 3.13).

Sixty-four percent of the adult tarāpunga / red-billed gulls counted during this survey (1,187 birds) were counted at the Nelson Boulder Bank breeding colony, highlighting the importance of this site as breeding habitat for Nelson City's tarāpunga / red-billed gulls. At least 168 chicks and fledglings were also counted at

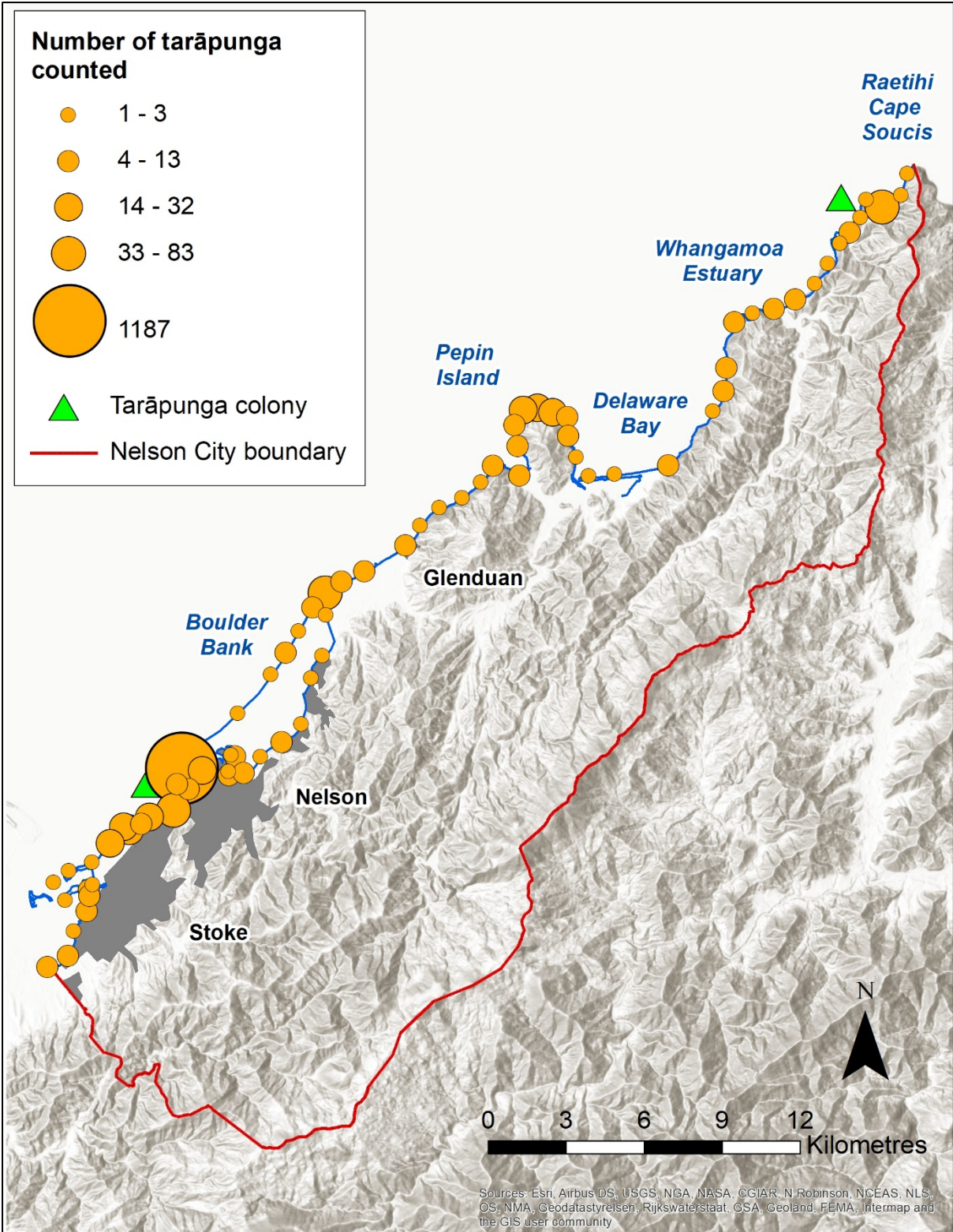
this colony, along with at least 110 occupied nests. The number of adults, chicks, fledglings and nests counted at this colony are almost certain to be an underestimate of the size and productivity of this colony, for two reasons. Firstly, it was obvious that a large number of chicks had already successfully fledged from this colony by the time that this survey was carried out, with significant numbers of fledglings and their attendant parents observed on the adjacent mainland coastline during the survey. Secondly, the size and layout of the colony made it difficult to take a systematic set of good-quality photographs from which numbers of adults, chicks, fledglings and nests could be accurately counted. Nonetheless, it is clear from these results that the southern end of the Nelson Boulder Bank provides regionally-significant breeding habitat for tarāpunga / red-billed gulls within Nelson City. A second, smaller breeding colony was also located on coastal cliffs south of Cape Soucis with a total of 83 adult birds and 33 occupied nests counted.

Due to the advanced stage of nesting by locally-breeding tarāpunga / red billed gulls at the time of this survey, it was not possible to obtain an accurate estimate of the size of the Nelson City breeding population of this species from our survey data. Ideally, any breeding population estimate should be based on a count of the number of occupied nests during peak incubation. That said, we recorded a total of 1,270 adult tarāpunga / red billed gulls at the two breeding colonies encountered during this survey, which provides a conservative approximation of the Nelson City breeding population during the 2020-2021 season. To gain a more accurate and precise estimate of the number of tarāpunga / red-billed gulls breeding along the Nelson City coastline, we recommend that an annual count of the Nelson Boulder Bank colony should be carried out during the month of November to count the number of occupied nests in any colonies located. To obtain an accurate count of occupied nests, we'd also recommend that the use of a drone to obtain high-quality photographs of the colony should be investigated.

This is the first regional census count of tarāpunga / red-billed gulls that has been carried out along the entire Nelson City coastline, so no information on regional population trends is currently available.

The national population has declined by at least 25% since the early 1960s however, from an estimated 80,000 breeding birds in 1960 (Gurr & Kinsky, 1965) to between 55,662 and 60,000 breeding birds in 2014-2016 (Frost & Taylor, 2018). The current national NZTCS ranking for this species is based on an assumption that the species is declining at a rate of between 10 and 50% over three generations (Robertson et al, 2017). Assuming a national breeding population of 55,662 – 60,000 birds, the 1,270 adult tarāpunga / red-billed gulls encountered at nesting colonies along the Nelson City coastline during this survey represents 2% of the national population.

Applying a regional population estimate of 1,270 breeding tarāpunga / red-billed gulls to the NZTCS criteria and assuming that the population is declining at a rate of between 10 and 50% every three generations, we recommend that the tarāpunga / red-billed gull should be ranked as Regionally Vulnerable in Nelson City based on criterion C (1/1) 1000–5000 mature individuals, predicted decline 10–50% (Townsend et al, 2008; Crisp, 2020). We also recommend that this ranking be given the qualifiers DPS (Data Poor Size), DPT (Data Poor Trend) and CI (Climate Impacts) according to the qualifier definitions provided by Rolfe et al, (2021).



**Figure 3.13: Distribution and relative abundance of tarāpunga / red-billed gulls along the Nelson City coastline (NB: the green triangle symbols on the map are offset to the left of the actual locations of nests, chicks and breeding colonies so that both breeding records and abundance data can be displayed on the same map).**

### 3.2.11 Matuku moana / reef heron (*Egretta sacra*)



Image courtesy of Duncan Watson/NZ Birds Online

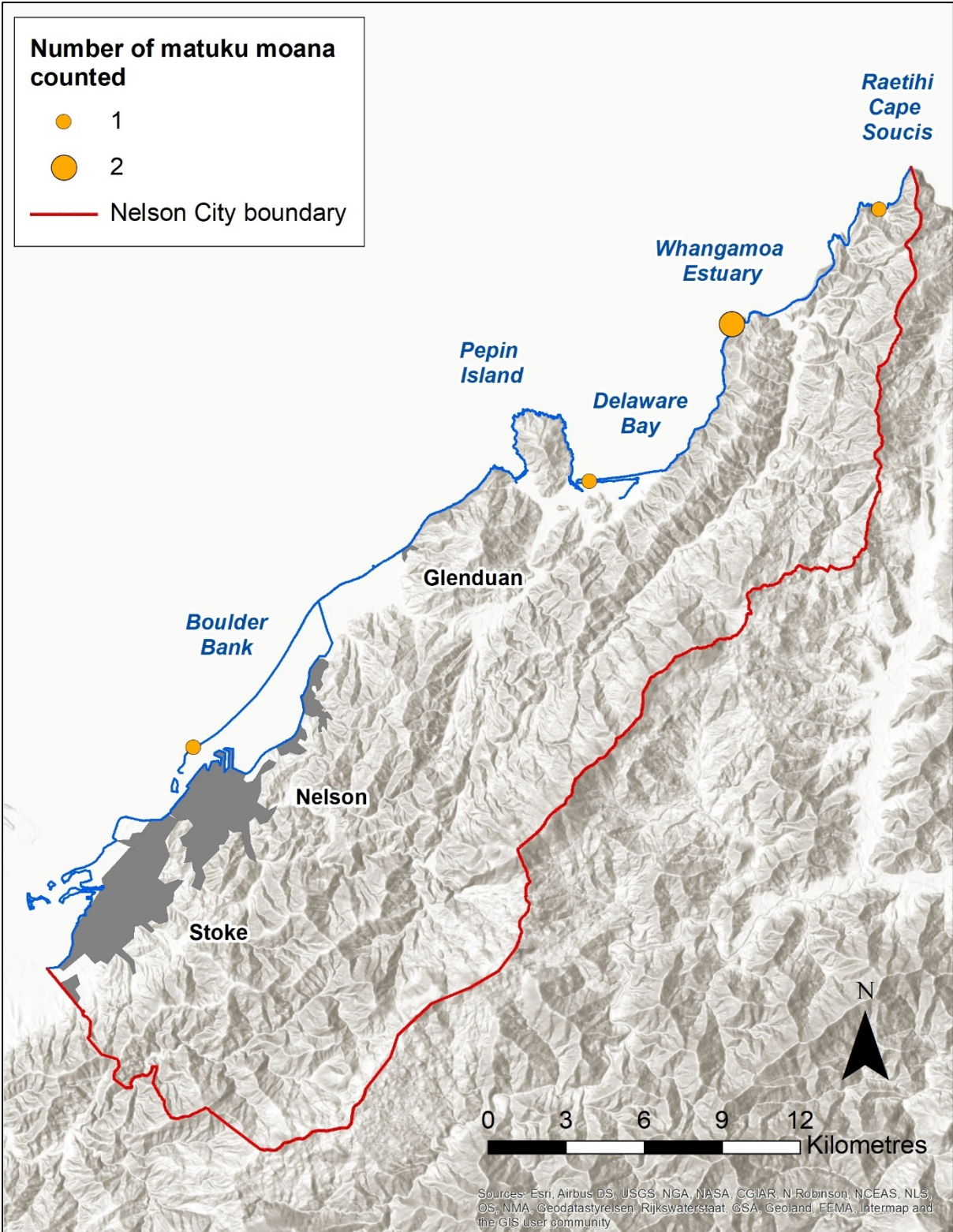
#### **National conservation status:**

Nationally Endangered (Robertson et al, 2017)

Five adult matuku moana / reef herons were counted during this survey, occupying 4 (4.1%) of the 97 1 km sections of coastline surveyed (Figure 3.14). Single birds were recorded near the southern end of the Nelson Boulder Bank, on the Delaware Bay sandspit and near Cape Soucis, and two birds were recorded on cliffs and rock stacks just south of the Whangamoa Estuary (Figure 3.14).

Matuku moana / reef herons appear to be exceedingly rare along the central New Zealand coastline. The mean of 0.05 birds/km recorded during this survey is similar to the low densities found other stretches of coastline in the lower North Island and upper South Island. For example, a total of 15 matuku moana / reef herons were counted along 460 km of coastline (a mean of 0.03 birds/km) in the greater Wellington region in 2017-2018 (McArthur et al, 2019) and nine matuku moana / reef herons were counted along 321 km of coastline (a mean of 0.03 birds/km) in the Hawke's Bay region in January 2021. Similarly, 57 matuku moana / reef herons were counted along the 1,500 km coastline (a mean of 0.04 birds/km) of the Marlborough Sounds in 2006 (Bell, 2010a). Given the apparently large amount of suitable rocky shore habitat present along the coastlines of all four of these regions, the number of matuku moana / reef herons counted during these surveys appears to be unnaturally low. This in turn suggests that one or more environmental factors have caused matuku moana / reef heron populations in central New Zealand to decline to an extremely low level.

Based on an estimated population of just five adult birds, the matuku moana / reef heron is currently one the rarest breeding bird species within Nelson City limits. Applying this population estimate of five birds to the regional New Zealand Threat Classification System criteria, we recommend that this species should be ranked as Regionally Critical in Nelson City based on criterion A(1): <250 mature individuals (Townsend et al, 2008; Crisp, 2020). We recommend that this ranking be given the qualifiers CI (Climate Impacts), CR (Conservation Research Needed) and SO (Secure Overseas) according to the qualifier definitions provided by Rolfe et al, (2021).



**Figure 3.14: Distribution and relative abundance of matuku moana / reef herons along the Nelson City coastline.**

### 3.2.12 Tōrea / South Island pied oystercatcher (*Haematopus finschi*)



Image courtesy of Steve Attwood/NZ Birds Online

#### **National conservation status:**

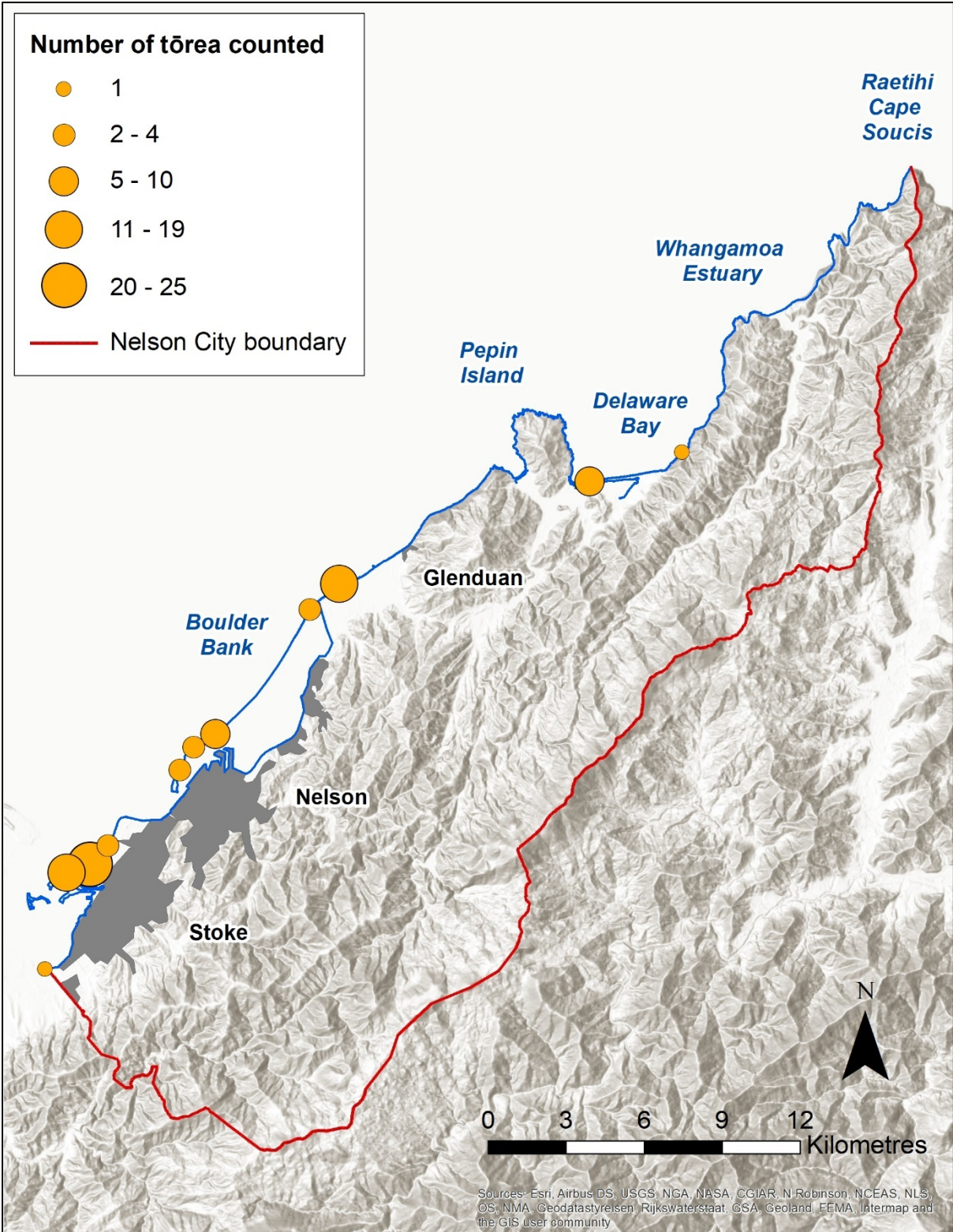
At Risk, Declining (Robertson et al., 2017)

Ninety-three tōrea / SI pied oystercatchers were counted during this survey, occupying 11 (11.3%) of the 97 1 km sections of coastline surveyed (Figure 3.15). These birds had a fairly clustered distribution along the Nelson City coastline, with concentrations of birds on Tahunanui Beach, the Nelson Boulder Bank and Glenduan foreshore, and in Delaware Bay (Figure 3.15).

Tōrea / SI pied oystercatchers breed on braided rivers and farmland throughout the South Island and in Hawke's Bay, during the spring and summer months, then migrate to estuaries and harbours in the North Island and upper South Island for the non-breeding season (Heather & Robertson, 2015). Tōrea / SI pied oystercatchers begin breeding at around 3 years of age, with the majority of subadult birds appearing to remain at estuarine sites all year around. Since 2005, a mean of 17,000 tōrea / SI pied oystercatchers have been recorded during Birds New Zealand summer wader counts at estuaries throughout New Zealand, of which a mean of 961 birds (5.6%) are counted in Tasman Bay (Riegen & Sagar, 2020). During late summer and autumn, numbers of tōrea / SI pied oystercatchers present at coastal sites around New Zealand increases rapidly as adults and fledglings migrate northwards from their breeding grounds. Since 2015, a mean of 77,095 tōrea / SI pied oystercatchers have been recorded during Birds New Zealand winter wader counts carried out around New Zealand, of which a mean of 3,947 birds (5.1%) are counted in Tasman Bay (Riegen & Sagar, 2020).

Within Waimea Inlet and Nelson Haven, tōrea / SI pied oystercatchers are highly mobile, moving freely around the inlet depending on the state of the tide and in response to disturbance (DOC, unpublished data). For this reason, the 96 birds recorded during this survey likely underestimates the true number of birds that use the Nelson City coastline, instead it is more likely that a much large proportion of Tasman Bay's summer population of tōrea / SI pied oystercatchers utilises the mudflats along the Nelson City foreshore and in Nelson Haven at varying times over the summer months.

Applying a population estimate of <961 (non-breeding) tōrea / SI pied oystercatchers in Nelson City to the regional New Zealand Threat Classification System criteria, we recommend that this species should be ranked as a Migrant in Nelson City, based on the criterion that the tōrea / SI pied oystercatcher is a taxon that "predictably visit[s] Nelson City seasonally as part of [its] normal life cycle (a minimum of 15 individuals known or presumed to visit per annum) but [does] not breed here" (Townsend et al, 2008; Crisp et al, 2020). We recommend that this ranking be given the qualifier CI (Climate Impacts) and CR (Conservation research needed) according to the qualifier definitions provided by Rolfe et al, (2021).



**Figure 3.15: Distribution and relative abundance of tōrea / South Island pied oystercatchers along the Nelson City coastline.**



### 3.2.13 Kawau tikitiki / spotted shag (*Stictocarbo punctatus*)



#### **National conservation status:**

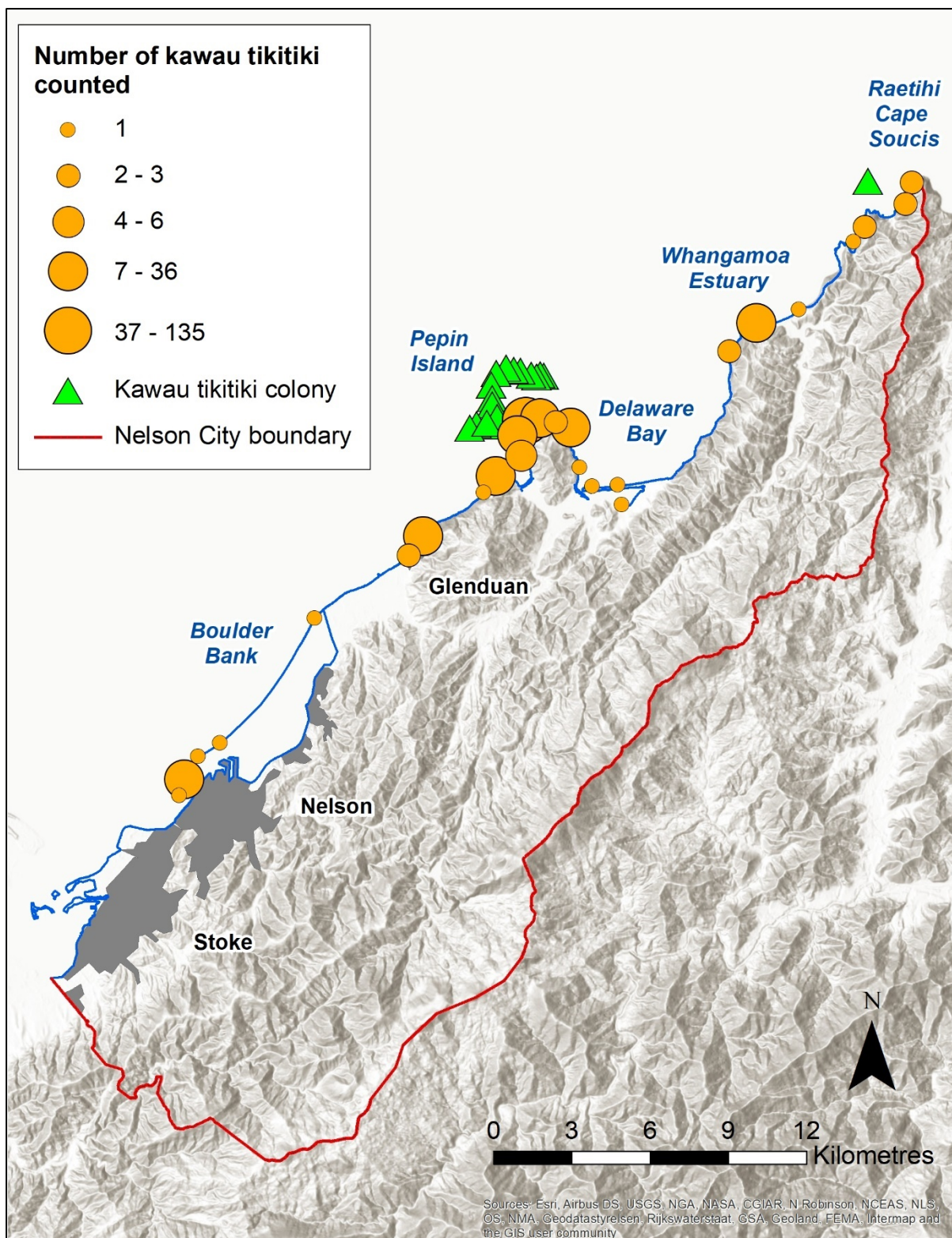
Not Threatened (Robertson et al., 2017)

Three hundred and twenty kawau tikitiki / spotted shags were counted during this survey, occupying 26 (26.8%) of the 97 1 km sections of coastline surveyed (Figure 3.16). Kawau tikitiki were the most common of the six species of shag that were recorded during this survey but have a highly clustered distribution along the Nelson City coastline. The majority of birds were encountered along the seaward coast of Pepin Island, with smaller concentrations of birds recorded at the entrance to Nelson Haven (including a single bird observed hitching a ride on the bulbous bow of a large container ship entering Nelson Port!), on the Glenduan foreshore, near the Whangamoia Estuary and near Cape Soucis (Figure 3.16). Sixteen largely vacant kawau tikitiki / spotted shag colonies and/or roost sites were located during this survey, fifteen of which were situated on cliffs and rock

stacks along the seaward coast of Pepin Island, and one of which was situated just south of Cape Soucis (Figure 3.17). These colonies/roosts were largely vacant at the time we carried out this survey, with the vast majority of birds encountered being in non-breeding plumage.

National population estimates for kawau tikitiki / spotted shags vary considerably from as few as 20,000 individuals to as many as 100,000 individuals (Heather & Robertson, 2015). Given that the majority of the kawau tikitiki / spotted shags recorded during this survey were observed in close proximity to nesting colonies, it's likely that the majority of the 360 birds counted are breeding along the Nelson City coastline. This being the case, the Nelson City kawau tikitiki / spotted shag population represents 0.4 – 1.8% of the national population of this species. It should be noted however that this is likely to be a substantial underestimate of the true breeding population size of this species within Nelson City, due to the fact that a large proportion of birds are likely to have been foraging out at sea at the time these surveys were conducted. To gain a much more accurate and precise estimate of the number of kawau tikitiki / spotted shags breeding along the Nelson City coastline, we recommend that a boat survey of the Pepin Island and Cape Soucis breeding colonies should be carried out during August-October to count the number of occupied nests within each colony.

In the meantime, applying a population estimate of 320 kawau tikitiki / spotted shags to the regional New Zealand Threat Classification System criteria, and assuming that the Nelson City population is stable, we recommend that the kawau tikitiki / spotted shag should be ranked as Regionally Endangered in Nelson City based on criterion B (1/1) 250–1000 mature individuals, stable population (Townsend et al, 2008; Crisp, 2020). We also recommend that this ranking be given the qualifiers DPS (Data Poor Size), DPT (Data Poor Trend) and CI (Climate Impacts) according to the qualifier definitions provided by Rolfe et al, (2021).



**Figure 3.16: Distribution and relative abundance of kawau tikitiki / spotted shags along the Nelson City coastline (NB: the green triangle symbols on the map are offset to the left of the actual locations of nests, chicks and breeding colonies so that both breeding records and abundance data can be displayed on the same map).**

### 3.2.14 Tōrea pango / variable oystercatcher (*Haematopus unicolor*)



Image courtesy of Rebecca Bowater/NZ Birds Online

**National conservation status:** At Risk, Recovering (Robertson et al, 2017)

A total of 347 adult tōrea pango / variable oystercatchers were counted during this survey, occupying 43 (44.3%) of the 97 1 km sections of coastline surveyed (Figure 3.17). Tōrea pango / variable oystercatchers are one of the most widespread coastal bird species encountered during this survey, with extremely high densities of birds found on the Nelson Boulder Bank and on Haulashore, Saxton, Pig and Oyster Islands, and on the Delaware Bay sandspit (Figure 3.17). Each of

these sites appear to provide exceptionally high-quality breeding habitat for tōrea pango / variable oystercatchers, likely due to the presence of extensive areas of unvegetated gravels and sand well above MHWS that are situated in close proximity to extensive areas of mudflats that are exposed at low tide. Each of these sites also appear to experience relatively low rates of human disturbance, as a result of limited accessibility. Along the length of this coastline, the presence of nests, broods of chicks and fledglings indicated that the Nelson City tōrea pango / variable oystercatcher population was experiencing relatively good nest survival, hatching and chick survival rates (Figure 3.17).

One hundred and seventy-two tōrea pango / variable oystercatchers (50% of the Nelson City population) were encountered on the Nelson Boulder Bank during this survey, demonstrating that this site provides regionally, nationally and likely internationally-significant breeding habitat for this species. This count is similar to the 159 tōrea pango / variable oystercatchers counted on the Boulder Bank in October 2015 (Harper, 2015) and the 178 birds (89 pairs) counted between October and December 2016 (Moorehouse, 2017), suggesting the number of tōrea pango / variable oystercatchers breeding on the Nelson Boulder Bank has been relatively stable over the past six years.

With a mean density of 3.58 birds/km, tōrea pango / variable oystercatcher densities along the Nelson City coastline are more than double that recorded along other stretches of central New Zealand coastline. For example, a total of 712 tōrea pango / variable oystercatchers were counted along 460 km (a mean of 1.55 birds/km) of the greater Wellington region coastline during 2017-2018 (McArthur et al, 2019), and 516 tōrea pango / variable oystercatchers were counted along 321 km (a mean of 1.61 birds/km) of the Hawke's Bay coastline in January 2021 (McArthur et al, 2021b). Similarly, a total of 730 tōrea pango / variable oystercatchers were counted along 1,500 km (a mean of 0.49 birds/km) of the Marlborough Sounds coastline in 2006 (Bell, 2010b). The much higher densities of tōrea pango / variable oystercatchers along the Nelson City coastline compared to other stretches of central New Zealand coastline is likely due to the much larger areas of intertidal mudflat habitats present along the Nelson City coast, in comparison to the coastlines of the Hawke's Bay and Greater Wellington regions and in the Marlborough Sounds.

This is the first census count of tōrea pango / variable oystercatchers that has been carried out along the entire Nelson City coastline, so no information on population trends is currently available. Nationwide however, tōrea pango / variable oystercatcher numbers have increased steadily in recent decades. The mean number of tōrea pango / variable oystercatchers recorded during Birds New

Zealand winter wader counts increased by 77% between 1983-1994 and 2005-2019, from a mean of 1,393 birds recorded annually during nationwide counts carried out between 1983-1994 to a mean of 2,802 birds recorded annually during counts carried out between 2005-2019 (Riegen & Sagar, 2020). Some of this recent increase in numbers is likely to be a consequence of the improved management of New Zealand dotterel breeding habitats in the northern North Island, although similar increases have also been observed in other parts of New Zealand, including in the Nelson-Tasman region (Riegen & Sagar, 2020). Applying this new population estimate of 347 adult tōrea pango / variable oystercatchers in Nelson City to the regional New Zealand Threat Classification System criteria, and assuming that the Nelson City population is increasing at a rate of >10% over three generations, we recommend that the tōrea pango / variable oystercatcher should be ranked as Regionally Vulnerable in Nelson City based on criterion A(1/1): 250–1000 mature individuals, predicted increase >10% (Townsend et al, 2008; Crisp, 2020). We also recommend that this ranking be given the qualifiers CI (Climate Impacts) and INC (Increasing) according to the qualifier definitions provided by Rolfe et al, (2021).

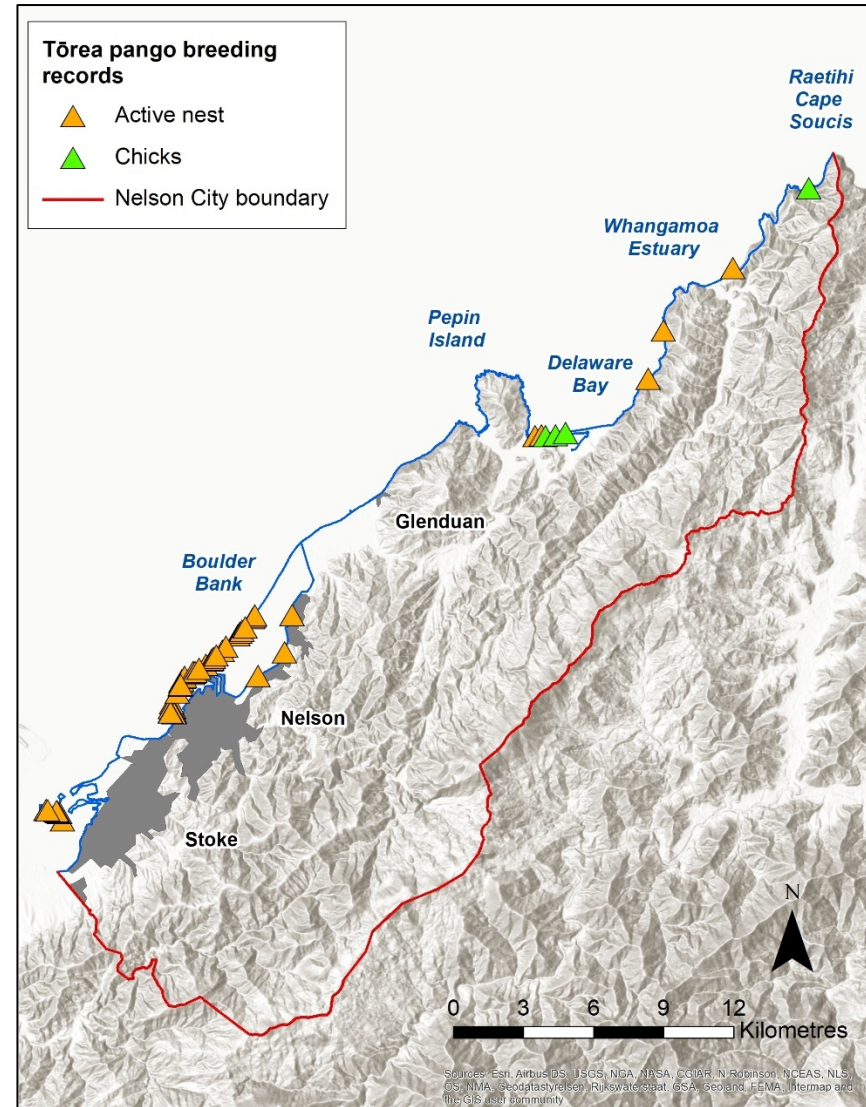
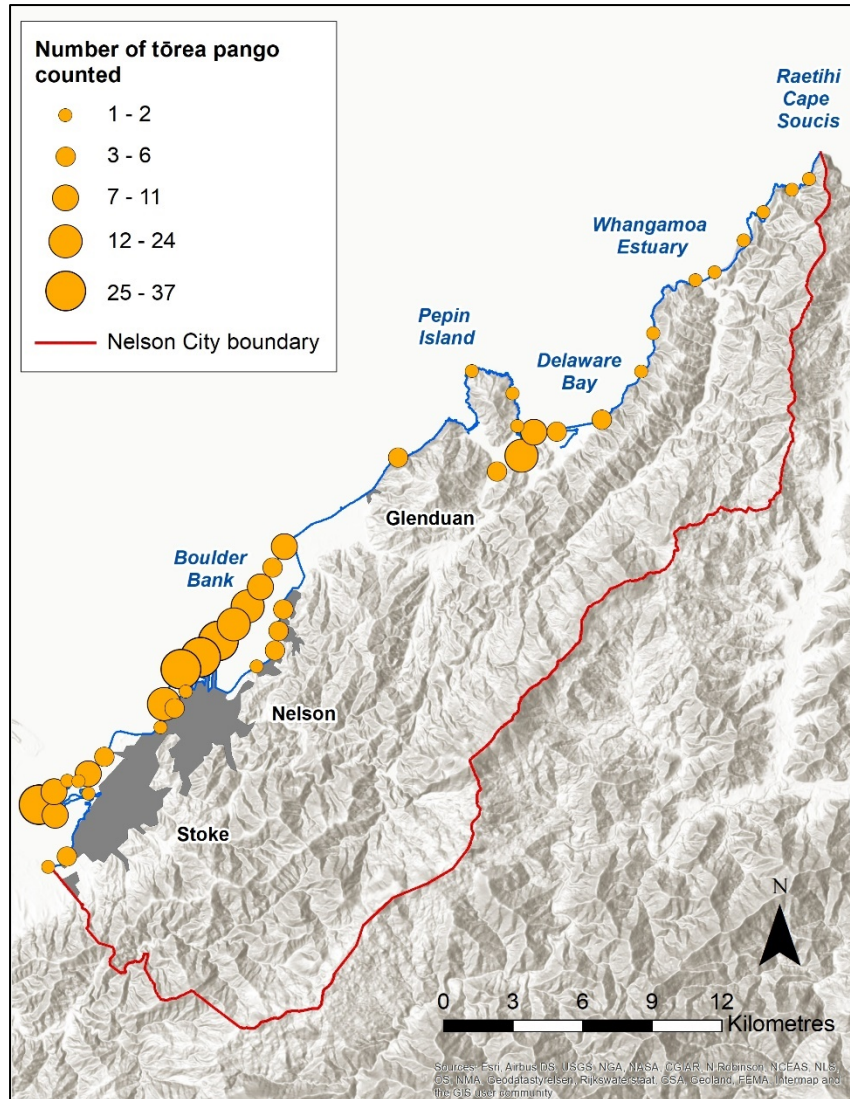


Figure 3.17: Distribution, relative abundance and breeding observations of tōrea pango / variable oystercatchers along the Nelson City coastline.

### 3.2.15 Tara / white-fronted tern (*Sterna striata*)



Image courtesy of Rebecca Bowater/NZ Birds Online

**National conservation status:** At Risk, Declining (Robertson et al, 2017)

A total of 457 adult tara / white-fronted terns were counted during this survey, occupying 44 (45.4%) of the 97 1 km sections of coastline surveyed (Figure 3.18). Tara / white-fronted terns had a clustered distribution along the Nelson City coastline, with local concentrations of birds occurring along the coastline between Whangamoia and Cape Soucis, along the seaward coastline of Pepin Island, the Glenduan Coastline and at the southern tip of the Nelson Boulder Bank. In contrast, relatively low numbers of birds

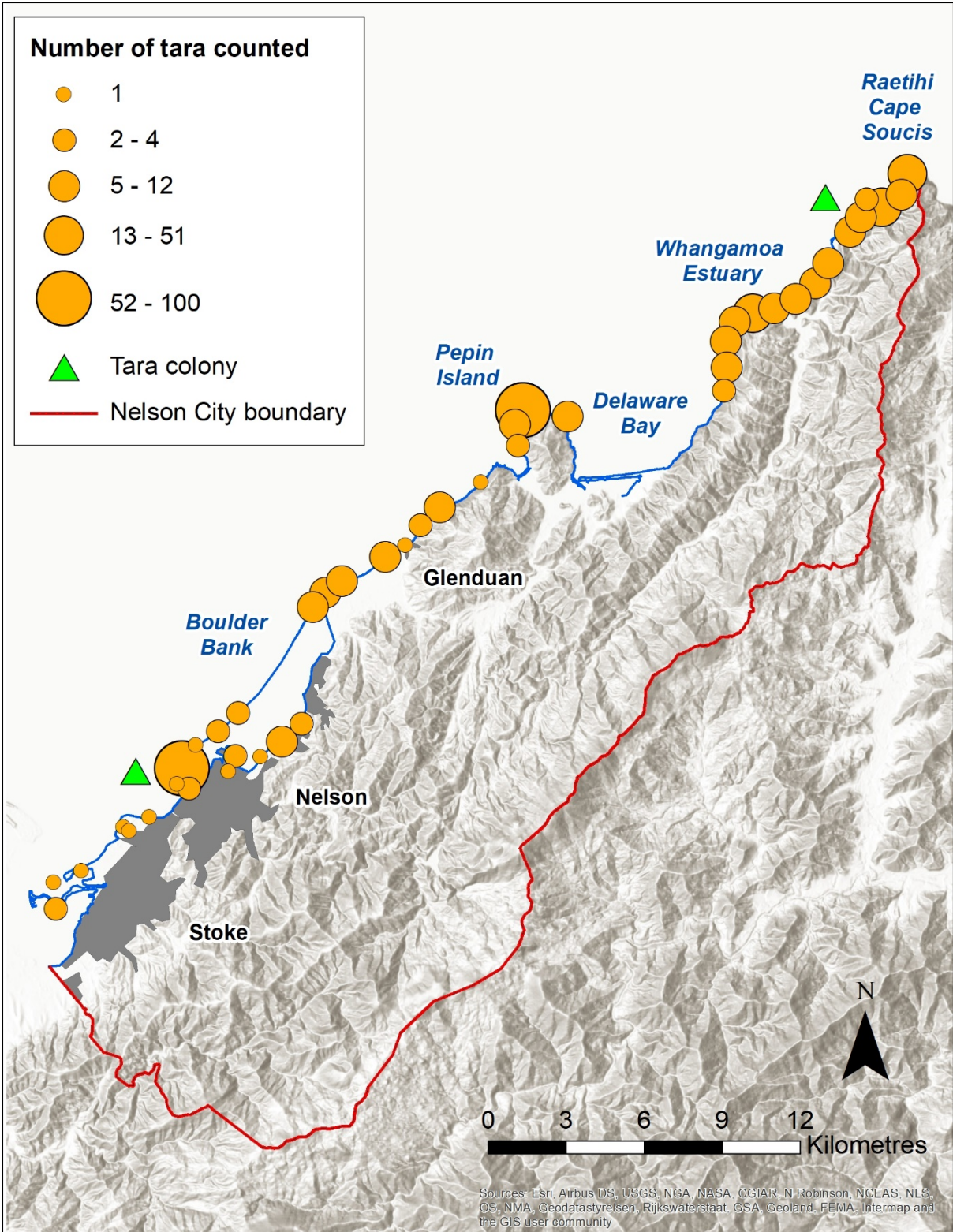
were encountered in Nelson Haven and Delaware Bay and along the eastern shoreline of Waimea Inlet (Figure 3.18).

Tara / white-fronted terns were found to be breeding at two locations along the Nelson City coastline, on the southern tip of the Nelson Boulder Bank and on cliffs just south of Cape Soucis (Figure 3.18). Twenty-two percent of the adult tara / white-fronted terns counted during this survey (99 birds) were counted at the Nelson Boulder Bank breeding colony, highlighting the importance of this site as breeding habitat for Nelson City's tara / white-fronted terns. At least 48 chicks and fledglings were also counted at this colony, along with at least 14 occupied nests. The number of adults, chicks, fledglings and nests counted at this colony are almost certain to be an underestimate of the size and productivity of this colony, for two reasons. Firstly, it was obvious that some chicks had already successfully fledged from this colony by the time that this survey was carried out, with significant both fledglings and their attendant parents observed on the adjacent mainland coastline during the survey. Secondly, the size and layout of the colony made it difficult to take a systematic set of good-quality photographs from which numbers of adults, chicks, fledglings and nests could be accurately counted. Nonetheless, it is clear from these results that the southern end of the Nelson Boulder Bank provides regionally-significant breeding habitat for tara / white-fronted terns within Nelson City. A second, smaller breeding colony was also located on coastal cliffs south of Cape Soucis with a total of 20 adult birds and at least two occupied nests counted.

Due to the advanced stage of nesting by locally-breeding tara / white-fronted terns at the time of this survey, it was not possible to obtain an accurate estimate of the size of the Nelson City breeding population of this species from our survey data. Ideally, any breeding population estimate should be based on a count of the number of occupied nests during peak incubation. That said, we recorded a total of 119 adult tara / white-fronted terns at the two breeding colonies encountered during this survey, which provides a conservative approximation of the Nelson City breeding population during the 2020-2021 season. To gain a more accurate and precise estimate of the number of tara / white-fronted terns breeding along the Nelson City coastline, we recommend that an annual count of the Nelson Boulder Bank colony should be carried out during the month of November to count the number of occupied nests in any colonies located. To obtain an accurate count of occupied nests, we'd also recommend that the use of a drone to obtain high-quality photographs of the colony should be investigated.

This is the first regional census count of tara / white-fronted terns that has been carried out along the entire Nelson City coastline, so no information on regional population trends is currently available. Knowledge of the national population size and trend is similarly poor. The national population was estimated to total between 24,000 and 30,000 birds in the late 1990s (Taylor, 2000), however the population appears to have declined over the past several decades (Taylor, 2000; Heather & Robertson, 2015). The current national NZTCS ranking for this species is based on an assumption that the species is declining at a rate of between 10 and 50% over three generations (Robertson et al, 2017). Assuming a national population of 24,000 – 30,000 birds, the 119 adult tara / white-fronted terns encountered at nesting colonies along the Nelson City coastline during this survey represents 0.4 – 0.5% of the national population.

Applying a regional population estimate of 119 breeding tara / white-fronted terns to the NZTCS criteria, we recommend that the tara / white-fronted tern should be ranked as Regionally Critical in Nelson City based on criterion A(1): <250 mature individuals (Townsend et al, 2008; Crisp, 2020). We also recommend that this ranking be given the qualifiers DPS (Data Poor Size), DPT (Data Poor Trend), CI (Climate Impacts) and CR (Conservation Research Needed) according to the qualifier definitions provided by Rolfe et al, (2021).



**Figure 3.18: Distribution and relative abundance of tara / white-fronted terns along the Nelson City coastline (NB: the green triangle symbols on the map are offset to the left of the actual locations of nests, chicks and breeding colonies so that both breeding records and abundance data can be displayed on the same map).**



## 4. Discussion

### 4.1 Identification and mapping of sites with Significant Conservation Values

Appendix Four of the Nelson Resource Management Plan includes a list of eight sites of “significant conservation value” (SSCV) that have been identified within the Nelson City coastal marine area and provides a description of the natural values of each of these sites (NCC, 2012). It has been a number of years since these sites were identified and their values summarised, so the completion of this first systematic survey of the avifauna values of the Nelson City coastline presents NCC with an opportunity to revise and update its list of coastal SSCVs by using this dataset to apply known avifauna values to a set of criteria designed to identify sites that meet thresholds for “significance”, and to updated the values descriptions of the sites identified.

In recent years, ecological criteria have been used by a number of regional authorities in New Zealand to identify areas of significant indigenous vegetation and significant habitats of indigenous fauna according to a standardised and evidence-based process. For example, Greater Wellington Regional Council has developed criteria to identify avifauna values that meet significance thresholds for ecological rarity, diversity and ecological context which have been used to identify a network of 51 coastal and freshwater habitats of significance for indigenous birds in the Wellington region (GWRC, 2015; McArthur, 2020; Appendix Two). Such criteria will likely need to be region-specific, given biogeographic differences between regions, but the avifauna criteria developed by Greater Wellington Regional Council may make a useful starting point for the development of a set of criteria that are more fit-for-purpose for Nelson City.

It is clear from the results of this survey that the Nelson City coastline includes sites that provide habitat for internationally, nationally and regionally significant populations of indigenous birds, including those of nationally and regionally threatened species. A number of these sites already fall entirely within existing SSCVs, but the summaries of known values of these SSCVs don’t accurately describe their avifauna values at present. For example, the summary of values for the Boulder Bank SSCV mentions that “a small number of rare tōrea pango / variable oystercatchers nest along the Boulder Bank” whereas the results of this survey demonstrate that 172 birds (50% of the Nelson City breeding population) occur along the Nelson Boulder Bank. Similarly, the summary of values for the Whangamoia River mouth to Cape Soucis SSCV points out that “the ecology of this area is relatively poorly known” and mentions only the presence of matuku moana /reef heron. As a result of this survey, we now know that this section of the Nelson City coastline provides foraging and roosting habitat for at least 2.5% of the global population of pāteketeke / king shags.

To ensure that Nelson City’s list of coastal SSCVs includes all of the existing significant coastal habitats for indigenous birds, we recommend that NCC carries out a re-assessment of coastal SSCVs by developing a set of avifauna “significance” criteria that can be applied to available coastal bird survey datasets to identify coastal sites that support internationally, nationally and regionally significant populations or communities of indigenous birds. The avifauna data used in this review can also be used to create concise and up-to-date descriptions of the avifauna values of each site identified in the review (including those sites that have already been identified), and these descriptions can then be used to develop suitable policies and rules governing the appropriate use of these areas; to inform assessments of environmental effects of activities requiring resource consents, and to develop appropriate resource consent conditions. We suggest that the process and criteria used by Greater

Wellington Regional Council to identify “significant habitats for indigenous birds” in the Wellington region would make a useful starting point for conducting a similar review of coastal SSCVs in Nelson City.

## 4.2 Improving regional oiled wildlife response preparedness

The data collected during this regional coastal bird survey provide the most detailed and complete picture of the indigenous bird values of the Nelson City coastline ever assembled. In addition to collecting these bird data, our field surveyors also mapped spatial patterns in the abundance of kekeno / New Zealand fur seals (*Arctocephalus forsteri*) and terehu / bottlenose dolphins (*Tursiops truncatus*), the only two marine mammal species that were detected during the survey (Figure 4.1).

This survey has shown that the diversity of indigenous bird species tends to be highest on Nelson City's inshore islands, on the Nelson Boulder Bank and on the Glenduan and Whangamoā – Cape Soucis coastlines. This survey has also identified a small network of coastal sites that supports relatively large proportions of the breeding populations of a number of Regionally Threatened or At Risk species. For example, the Nelson Boulder Bank supports 50% of Nelson City's breeding population of tōrea pango / variable oystercatchers and the seaward coastline of Pepin Island provides nesting and roosting habitat for almost the entire Nelson City breeding population of kawau tikitiki / spotted shags. This being the case, we recommend that these high value sites be considered high priority sites at which efforts to control, contain or manage the impacts of an oil spill should be deployed. By using these sites as a means of prioritising an oiled wildlife response, resources will quickly be targeted towards avoiding, minimising or mitigating the adverse impacts of an oil spill on significant populations of Nelson City's most highly threatened coastal bird species, and at sites that support a relatively high diversity of indigenous bird species.

By measuring spatial patterns in the abundance of coastal bird species along the Nelson City coastline, this survey also serves as a comprehensive baseline survey against which future changes in local or regional indigenous bird values can be measured. As a result, as well as creating the opportunity to optimise the deployment of resources during an oiled wildlife incident response, this dataset creates the opportunity to measure the adverse impacts of future oil spills that occur in the Nelson City coastal marine area, and the success or otherwise of any efforts to control, contain or manage the impacts of these incidents. For this reason, we recommend that this Nelson City coastal bird survey be repeated at five-yearly intervals, to improve NCC and Maritime New Zealand's (MNZ) ability to differentiate other temporal changes in Nelson City's coastal bird populations from the impacts of oil spill incidents and subsequent oiled wildlife response efforts. We therefore recommend that the next Nelson City coastal bird survey be scheduled to be carried out during the summer of 2025/2026.

This regional coastal bird survey fills some substantial gaps in our knowledge of spatial patterns in the distribution and abundance of coastal bird species in Nelson City, particularly those species that are relatively widespread along the coastline and are therefore not comprehensively surveyed during Birds New Zealand's national wader counts. As a result, the completion of this survey represents a major step forward in our understanding of coastal bird distribution abundance in Nelson City, creating the opportunity for relevant local and central government agencies to make better, evidence-based decisions regarding the sustainable management of Nelson City's coastline. That said, at least three minor gaps in our understanding of the wildlife values of the Nelson City coastline remain:

### 1. Population size and trends of kororā / little penguins

Because this regional coastal bird survey was conducted during daylight hours and survey effort was largely restricted to the coastal foreshore, the survey was not fit-for-purpose to

capture data describing the distribution and abundance of kororā / little penguins (*Eudyptula minor*), due to their nocturnal and burrow-nesting habits on land (Marchant & Higgins, 1990).

Little penguins are highly vulnerable to being adversely impacted by oil spills in the coastal marine area but also respond extremely well to rehabilitation after becoming oiled (Gartrell et al, 2019). For this reason, containing, controlling and managing the impacts of an oil spill on local little penguin populations will likely be a high priority for NCC and MNZ in the event of an oil spill incident within the Nelson City coastal marine area. Developing a detailed understanding of the abundance and distribution of breeding little penguins along Nelson City's coastline would greatly improve these agencies' readiness to avoid, minimise or mitigate any adverse impacts on this species.

To fill this knowledge gap, we recommend that NCC considers carrying out targeted kororā / little penguin surveys along pre-selected sections of coastline that are either known or suspected to provide breeding or moulting habitat for this species. Systematic surveys should involve engaging a DOC-certified kororā / little penguin detector dog and handler to search for burrows along priority sections of coastline. Along the remainder of the coast, NCC could consider engaging local community groups and the general public to report any penguin encounters, or to conduct early morning, low tide surveys along stretches of sandy beach to identify the presence of kororā / little penguin tracks.

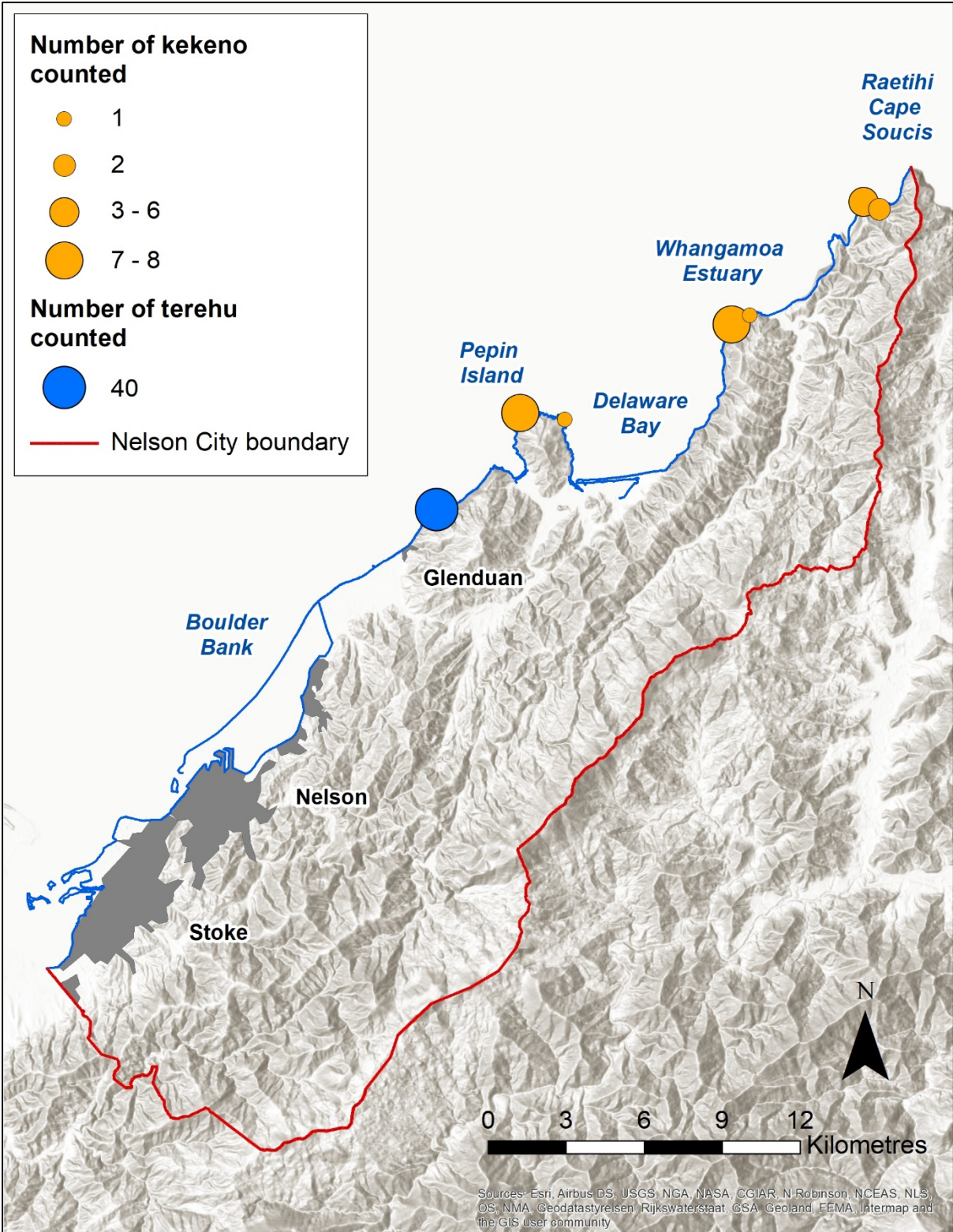
## **2. Population size and trends of kawau tikitiki / spotted shags**

National population estimates for kawau tikitiki / spotted shags vary considerably from as few as 20,000 individuals to as many as 100,000 individuals (Heather & Robertson, 2015). Given that the majority of the kawau tikitiki / spotted shags recorded during this survey were observed in close proximity to nesting colonies, it is likely that the majority of the 360 birds counted are breeding along the Nelson City coastline. This being the case, the Nelson City kawau tikitiki / spotted shag population is likely to represent at least 0.4 – 1.8% of the national population of this species. It should be noted however that this is likely to be a substantial underestimate of the true breeding population size of this species within Nelson City, due to the fact that a large proportion of locally-breeding birds were likely to have been foraging out at sea at the time these surveys were conducted. To gain a much more accurate and precise estimate of the number of kawau tikitiki / spotted shags breeding along the Nelson City coastline, and the proportion of the national population that this represents, we recommend that a boat survey of the Pepin Island and Cape Soucis breeding colonies should be carried out during September-October to count the number of occupied nests present within each colony.

## **3. Population size and trends of kekeno / NZ fur seals**

This regional coastal survey has done a relatively good job at mapping the distribution and abundance of kekeno / NZ fur seals that occur along the Nelson City coastline (Figure 4.1), given that this survey was done at a time of year when occupancy rates at local rookeries would have been relatively high (Bradshaw et al., 1999). Counts carried out at seal rookeries are known to provide the best data for consistent estimates of population size, however because adult occupancy rates at rookeries can vary substantially from day to day, counts of

the number of pups present at rookeries provide the best measure of population size, trend and population productivity (Shaughnessy et al., 1994). During the survey reported here, our fieldworkers recorded only total counts of seals encountered per 1 km of coastline and did not record separate counts of the number of seal pups encountered. During future surveys therefore, we recommend that a separate count of the number of seal pups be kept, to provide the most consistent measures of fur seal population size and productivity along the Nelson City coastline. Further to this, non-breeding and post-breeding seals are also known to congregate at non-breeding sites ('haul-outs'), which can be situated at different locations along the coastline to rookeries, and peak occupancy at these haul-outs occurs in July-August (Crawley & Wilson, 1976). To adequately map the spatial distribution in seal abundance during the non-breeding season, we recommend that a regional winter survey of kekeno / NZ fur seal distribution and abundance be carried out, during the same years that the (summer) regional coastal bird survey is carried out. Given that we recommend that the next Nelson City coastal bird survey be carried out during the summer of 2025/2026, we recommend that a regional winter survey of kekeno / NZ fur seal distribution and abundance be scheduled to be carried out in July-August 2026. Should it not be feasible to carry out a winter kekeno / NZ fur seal survey along the entire Nelson City coastline, sections of coastline with relatively high kekeno / NZ fur seal winter occupancy probabilities could be mapped using pre-existing data sources and these sections of coastline could be targeted as a matter of priority.



**Figure 4.1: Distribution and relative abundance of marine mammals along the Nelson City coastline.**

### 4.3 Reassessment of regional threat rankings of selected coastal bird species

The New Zealand Threat Classification System provides a tool for assigning a national threat status to individual species, reflecting our knowledge of each species' population size and trends and helping to inform interventions to identify and remedy factors causing population declines (Townsend et al, 2008; Crisp, 2020). Regional Councils and unitary authorities have statutory obligations to manage the habitats of threatened species within their regions under the Resource Management Act (1991). Until recently, these agencies have used national threat rankings to inform policies, rules and management actions designed to meet these obligations. In many cases however, the regional threat status of a species can differ significantly from the species' national status, so in recent years a number of regional councils have been working with the Department of Conservation to create a methodology within the New Zealand Threat Classification System for assigning regional threat rankings to species, to better inform local efforts to maintain the habitats of species threatened at the regional, as well as national scale (Crisp, 2020). Although regional threat rankings have not yet been developed for Nelson City's bird species, the results of this survey have enabled us to assess the regional of 15 indigenous bird species present in Nelson City that are either entirely or partly restricted to coastal habitats in the region. These proposed rankings demonstrate that Nelson City Council likely has access to a sufficient quantity of bird survey data and expert local knowledge to carry out a full assessment of the regional threat rankings for Nelson City's birds. We recommend that Nelson City Council investigates carrying out a full assessment of the regional threat rankings if Nelson City's birds, using the methodology described in Crisp, 2020. We also recommend that any first assessment should be timed to be carried out after the completion of the next revision of the national NZTCS rankings, which is scheduled to be published in late 2021. We further recommend that Nelson City Council engages with Tasman District Council to investigate the relative merits of carrying out an assessment of the regional threat status of birds in the combined Nelson-Tasman region, versus conducting separate reviews for Nelson City and the Tasman District.

Of the 15 coastal bird species for which we have assessed regional threat rankings in this report, eleven of these (73%) have been assigned the new "Climate Impacts" qualifier recently added to the New Zealand Threat Classification System by Rolfe et al, (2021). This new qualifier is designed to identify taxa that are, or are predicted to be, adversely affected by long-term climate trends and/or extreme climatic events, including extended periods of abnormal rainfall or sunshine hours, short-duration extreme weather events, and gradual changes to sea level and average temperatures. Adverse effects of climate change on individual taxa may be direct (e.g., the impacts of extreme weather on populations) or indirect (e.g., increased impacts of predators that have benefitted from climate-change induced environmental changes) (Rolfe et al, 2021).

The assignment of the Climate Impact qualifier to a taxon indicates a need for more in-depth research, ongoing monitoring of climate impacts, and potentially a climate change adaptation plan for the taxon (Rolfe et al, 2021). The fact that 73% of the taxa re-assessed here have been assigned this qualifier highlights therefore the high degree of vulnerability that the majority of Nelson City's indigenous coastal bird species have to the impacts of climate change. For example, the Intergovernmental Panel on Climate Change Fifth Assessment Report estimates that global mean sea levels will rise by up to 0.98 m above current levels by the year 2100, assuming unmitigated growth in carbon emissions over that time (Church et al, 2013). However, a more recent survey of climate scientists has estimated that global mean sea levels could rise by up to 1.32 m over the same period (Horton et al, 2020). Under these scenarios, the Nelson City coastline is likely to become much more prone to flooding in coming decades due to a substantial and rapid increase in the frequency of extreme storm-tide and skew-

surge events which in turn may increase rates of coastal erosion (Stephens et al, 2020). These potential future changes to the flooding risk and geomorphology of Nelson City's coastline pose a substantial long-term risk to the viability of indigenous coastal bird populations due to reductions in productivity (caused by local losses of eggs and chicks to flooding) and local population size (caused by net losses in the total area of available habitat). These future impacts may be sufficiently severe to negate any efforts that have been made in the meantime to reduce the adverse impacts of other threats including mammalian predators, weeds, recreational activities and land-use changes, highlighting an urgent need for NCC to include consideration of climate change impacts on indigenous coastal bird species into all aspects of the future management of the Nelson City coastline and its avifauna values.

#### 4.4 Implementing the Proposed National Policy Statement for Indigenous Biodiversity

Policy 13 of the Proposed National Policy Statement for Indigenous Biodiversity (PNPSIB) requires local government agencies to “identify the possible presence of, and manage, highly-mobile fauna” (MFE, 2019). More specifically, the PNPSIB requires each regional council and unitary authority to work with local territorial authorities “to survey and record areas outside Significant Natural Areas where highly mobile fauna have been, or are likely to be, sometimes present” and to “include objectives, policies or methods in their policy statements and plans for managing the adverse effects of subdivision, use and development in highly mobile fauna areas, as necessary to maintain viable populations of highly mobile fauna across their natural range” (MFE, 2019).

The PNPSIB does not include a list of taxa that have been defined as “highly mobile fauna”, however it does define “highly mobile fauna” as animals that move frequently between environments, either to find food, safe locations, locate mates, or seek out certain climates. This includes animals that undertake movements over a district, regional, national or international scale, and over timeframes spanning a day, weeks or months. This definition includes migratory species that leave their breeding areas to go somewhere else for a range of reasons (e.g., pohowera / banded dotterel; tarapiroe / black-fronted tern, *Chlidonias albostratus* and ngutu pare / wrybill). It also includes species that use the landscape less predictably, include those that cycle around habitat patches that vary in their suitability and resources over time (e.g., kākā, *Nestor meridionalis* and matuku hūrepo / Australasian bittern, *Botaurus poiciloptilus*) (MFE, 2019).

The Department of Conservation (DOC) has also initiated a mobile terrestrial threatened species research programme, with the aim of identifying and describing the spatial and temporal scales at which “mobile” species use, or move through, the landscape. Specifically, the purpose of this research programme is to identify significant flyways and habitat networks that need to be managed over the entire lifespan of mobile species, to ensure their persistence (DOC, 2020). As part of this programme, DOC has adopted a “mobile species” definition very similar to that used by the PNPSIB. Namely, mobile species are:

*Species that use the environment at regional and national landscape scales, often moving across rohe, takiwā or territorial authorities' jurisdictions on a seasonal basis to exploit feeding and breeding resources* (DOC, 2020).



Furthermore, DOC has developed a list of Nationally Threatened and At Risk<sup>1</sup> bird species that meet their definition of being a “mobile species”. This list includes 62 bird taxa, 10 of which have been detected along the Nelson City coastline during this survey, representing 20% of the 50 bird species recorded during this survey. It should be noted however that up to 21 additional species recorded during this survey that are ranked as either nationally At Risk, Not Threatened, Migrant or Vagrant also meet the PNPSIB and DOC mobile species definitions, indicating that up to 31 of the 50 bird species recorded during this survey (62%) should be classified as mobile species under the PNPSIB.

By carrying out the first ever complete and systematic survey of the indigenous bird values of the Nelson City coastline, and in particular by mapping the distribution and abundance of indigenous birds to a 1 km spatial resolution along the entire Nelson City coastline, NCC has now mapped the summer distribution of up to 31 mobile bird species that occur within the Nelson City coastal marine area. This being the case, NCC has already made substantial progress towards implementing Policy 13 of the PNPSIB, namely to “survey and record areas outside Significant Natural Areas where highly mobile fauna have been, or are likely to be, sometimes present.”

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<sup>1</sup> Only those species ranked as nationally At Risk, Declining or At Risk, Recovering, AND have been given the qualifier CD (Conservation Dependent) have been included in this list.

## 5. Recommendations

Based on the results described in this report, we suggest that NCC considers adopting the following recommendations:

- That the Council conducts a re-assessment of its coastal sites of “significant conservation value”, to ensure that the network includes all coastal habitats within the Nelson City coastal marine area that are known to support nationally and regionally significant populations or communities of indigenous birds. Such a re-assessment should include the development of a standard set of “significance” criteria that can be applied to this coastal bird survey dataset and other available avifauna datasets to identify sites that qualify to be identified as sites with “significant conservation value”.
- That the Council considers carrying out a full assessment of the regional New Zealand Threat Classification System rankings of Nelson City’s birds, timed to be carried out once the next national NZTCS rankings re-assessment has been published. This assessment of the regional NZTCS rankings of Nelson City’s birds should include the recommended revised rankings included in this report. Consideration should also be given regarding whether NCC should collaborate with TDC to carry out an assessment of the NZTCS rankings for the combined Nelson-Tasman Region, rather than conducting separate assessments for both Nelson City and the Tasman District.
- That the Council follows up this survey with an annual count of the number of occupied tarāpunga / red-billed gull and tara / white-fronted tern nests present within the Nelson Boulder Bank colony during November each year.
- That the Council follows up this survey with a boat survey of the kawau tikitiki / spotted shag colonies and roost sites identified in this report, timed to be carried out between August and October to improve our understanding of the local breeding population size of this coastal bird species.
- That the Council follows up this survey with targeted surveys of kororā / little penguins using a DOC-certified little penguin detector dog and handler, to improve our understanding of the local population size and distribution of this coastal bird species. The Council should also consider engaging local community conservation groups and the general public to assist with kororā / little penguin survey work by reporting penguin encounters and by conducting early morning, low tide surveys for penguin footprints on sandy beaches within Nelson City.
- That the Council follows up this survey with targeted surveys of coastal cliffs and rock stacks for burrow-nesting seabirds including petrels and shearwaters. We recommend that the seaward coastline of Pepin Island, and coastal cliffs, headlands and rocks stacks between Whangamoia Point and Cape Soucis should be prioritised during such a survey.
- That the Council repeats the coastal survey summarised in this report once every five years, to maintain an up-to-date understanding of the distribution and abundance of indigenous bird

along the Nelson City coastline; to monitor populations trends and changes in bird distribution, to maintain an accurate baseline measure of indigenous bird distribution and abundance against which the impacts of oiled wildlife events and the effectiveness of any response can be accurately measured. We recommend that the next Nelson City coastal bird survey be programmed for the summer of 2025-2026.

- That during future regional coastal bird surveys, separate counts of adult kekeno / NZ fur seals and pups be made within each 1 km section of coastline surveyed, to provide the most consistent measure of kekeno / NZ fur seal population size and productivity.
- That the Council carries out a regional winter survey for kekeno / NZ fur seals along the Nelson City coastline, during the same years in which (summer) regional coastal bird surveys are carried out. Given that we recommend that the next regional coastal bird survey be carried out during the summer of 2025/2026, we recommend the first regional winter kekeno / NZ fur seal survey be carried out in July-August 2026.

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## Appendix One

The following table contains a list of all the bird species encountered during this Nelson City coastal bird survey. Species names and taxonomic order are those listed in Gill et al, (2010), with additional Māori names sourced from the Māori Dictionary Project (<https://maoridictionary.co.nz/>). National threat rankings are those listed in Robertson et al, (2017) and IUCN threat rankings have been sourced from <https://www.iucnredlist.org/> (Accessed 20/07/2021).

Māori name	Common name	Scientific name	National NZTCS ranking	IUCN threat ranking	Total number of individuals counted	Number (and percentage) of survey checklists in which species was observed
koera	California quail	<i>Callipepla californica</i>	Introduced and Naturalised	Least Concern	1	1 (1.1%)
kakīānau	black swan	<i>Cygnus atratus</i>	Not Threatened	Least Concern	4	1 (1.1%)
pūtangitangi	paradise shelduck	<i>Tadorna variegata</i>	Not Threatened	Least Concern	18	9 (9.3%)
tētē moroiti	grey teal	<i>Anas gracilis</i>	Not Threatened	Least Concern	25	6 (6.2%)
rakiraki	mallard	<i>A. platyrhynchos</i>	Introduced and Naturalised	Least Concern	41	19 (19.6%)
tuanui	flesh-footed shearwater	<i>Puffinus carneipes</i>	Nationally Vulnerable	Near Threatened	1	1 (1.1%)

Māori name	Common name	Scientific name	National NZTCS ranking	IUCN threat ranking	Total number of individuals counted	Number (and percentage) of survey checklists in which species was observed
pakahā	fluttering shearwater	<i>P. gavia</i>	At Risk, Relict	Least Concern	37	11 (11.3%)
tākupu	Australasian gannet	<i>Morus serrator</i>	Not Threatened	Least Concern	20	11 (11.3%)
kawau paka	little shag	<i>Phalacrocorax melanoleucos</i>	Not Threatened	Least Concern	44	24 (24.7%)
kawau	black shag	<i>P. carbo</i>	At Risk, Naturally Uncommon	Least Concern	1	1 (1.1%)
kāruhiruhi	pied shag	<i>P. varius</i>	At Risk, Recovering	Least Concern	101	35 (36.1%)
kawau tūi	little black shag	<i>P. sulcirostris</i>	At Risk, Naturally Uncommon	Least Concern	1	1 (1.1%)
kawau pāteketeki	king shag	<i>Leucocarbo carunculatus</i>	Nationally Endangered	Vulnerable	22	4 (4.1%)
kawau tikitiki	spotted shag	<i>Stictocarbo punctatus</i>	Not Threatened	Least Concern	320	26 (26.8%)
matuku moana	white-faced heron	<i>Egretta novaehollandiae</i>	Not Threatened	Least Concern	96	31 (32.0%)

Māori name	Common name	Scientific name	National NZTCS ranking	IUCN threat ranking	Total number of individuals counted	Number (and percentage) of survey checklists in which species was observed
matuku moana	reef heron	<i>E. sacra</i>	Nationally Endangered	Least Concern	5	4 (4.1%)
kotuku ngutupapa	royal spoonbill	<i>Platalea regia</i>	At Risk, Naturally Uncommon	Least Concern	1	1 (1.1%)
kāhu	swamp harrier	<i>Circus approximans</i>	Not Threatened	Least Concern	7	7 (7.2%)
pūkeko	pukeko	<i>Porphyrio melanotus</i>	Not Threatened	Least Concern	22	3 (3.1%)
kuaka	bar-tailed godwit	<i>Limosa lapponica</i>	At Risk, Declining	Near Threatened	26	2 (2.1%)
tōrea pango	variable oystercatcher	<i>Haematopus unicolor</i>	At Risk, Recovering	Least Concern	347	43 (44.3%)
tōrea	South Island pied oystercatcher	<i>H. finschi</i>	At Risk, Declining	Least Concern	93	11 (11.3%)
poaka	pied stilt	<i>Himantopus himantopus</i>	Not Threatened	Least Concern	46	9 (9.3%)
pohowera	banded dotterel	<i>C. bicinctus</i>	Nationally Vulnerable	Near Threatened	8	4 (4.1%)
	spur-winged plover	<i>Vanellus miles</i>	Not Threatened	Least Concern	25	10 (10.3%)

Māori name	Common name	Scientific name	National NZTCS ranking	IUCN threat ranking	Total number of individuals counted	Number (and percentage) of survey checklists in which species was observed
	Arctic skua	<i>Stercorarius parasiticus</i>	Migrant	Least Concern	8	4 (4.1%)
karoro	southern black-backed gull	<i>Larus dominicanus</i>	Not Threatened	Least Concern	621	70 (72.6%)
tarāpunga	red-billed gull	<i>L. novaehollandiae</i>	At Risk, Declining	Least Concern	1860	74 (76.3%)
tarāpuka	black-billed gull	<i>L. bulleri</i>	Nationally Critical	Near Threatened	5	1 (1.1%)
taranui	Caspian tern	<i>Hydroprogne caspia</i>	Nationally Vulnerable	Least Concern	31	17 (17.5%)
tara	white-fronted tern	<i>Sterna striata</i>	At Risk, Declining	Near Threatened	457	44 (45.4%)
	rock pigeon	<i>Columba livia</i>	Introduced and Naturalised	Least Concern	15	4 (4.1%)
pīpīwharauoa	shining cuckoo	<i>Chrysococcyx lucidus</i>	Not Threatened	Least Concern	2	2 (2.1%)
kōtare	New Zealand kingfisher	<i>Todiramphus sanctus</i>	Not Threatened	Least Concern	15	11 (11.3%)

Māori name	Common name	Scientific name	National NZTCS ranking	IUCN threat ranking	Total number of individuals counted	Number (and percentage) of survey checklists in which species was observed
korimako	bellbird	<i>Anthornis melanura</i>	Not Threatened	Least Concern	8	8 (8.2%)
tūī	tūī	<i>Prothemadera novaeseelandiae</i>	Not Threatened	Least Concern	2	2 (2.1%)
makipai	Australian magpie	<i>Gymnorhina tibicen</i>	Introduced and Naturalised	Least Concern	4	2 (2.1%)
	skylark	<i>Alauda arvensis</i>	Introduced and Naturalised	Least Concern	82	29 (29.9%)
tauhou	silvereeye	<i>Zosterops lateralis</i>	Not Threatened	Least Concern	21	15 (15.5%)
warou	welcome swallow	<i>Hirundo neoxena</i>	Not Threatened	Least Concern	121	42 (43.3%)
manu pango	Eurasian blackbird	<i>Turdus merula</i>	Introduced and Naturalised	Least Concern	31	22 (22.7%)
	song thrush	<i>T. philomelos</i>	Introduced and Naturalised	Least Concern	6	5 (5.2%)
tāringi	common starling	<i>Sturnus vulgaris</i>	Introduced and Naturalised	Least Concern	301	43 (44.3%)

<b>Māori name</b>	<b>Common name</b>	<b>Scientific name</b>	<b>National NZTCS ranking</b>	<b>IUCN threat ranking</b>	<b>Total number of individuals counted</b>	<b>Number (and percentage) of survey checklists in which species was observed</b>
tiu	house sparrow	<i>Passer domesticus</i>	Introduced and Naturalised	Least Concern	346	44 (45.3%)
	dunnock	<i>Prunella modularis</i>	Introduced and Naturalised	Least Concern	9	5 (5.1%)
pahirini	chaffinch	<i>Fringilla coelebs</i>	Introduced and Naturalised	Least Concern	46	25 (25.8%)
	greenfinch	<i>Carduelis chloris</i>	Introduced and Naturalised	Least Concern	37	17 (17.5%)
	goldfinch	<i>C. carduelis</i>	Introduced and Naturalised	Least Concern	30	9 (9.3%)
	common redpoll	<i>C. flammea</i>	Introduced and Naturalised	Least Concern	1	1 (1.1%)
	yellowhammer	<i>Emberiza citrinella</i>	Introduced and Naturalised	Least Concern	20	12 (12.3%)

## Appendix Two

This table lists the criteria used by Greater Wellington Regional Council to identify coastal and freshwater habitats of significance for indigenous birds in the Wellington region. A full explanation of how these criteria were developed and applied to available avifauna datasets can be found in [McArthur et al, 2015](#) and McArthur, 2020.

Policy 23 Criteria	(b) Rarity	(c) Diversity	(dii) Ecological Context
<b>Category 1 site (Meets the RPS Policy 23 criteria)</b>	The site provides habitat for: ≥10% of the regional population of a Nationally Critical species; or ≥15% of the regional population of a Nationally Endangered species; or ≥20% of the regional population of a Nationally Vulnerable species; or ≥25% of the regional population of an At Risk species	Seven or more Nationally Threatened or At Risk species are known to be resident at or regularly using the site	The site provides seasonal or core habitat for ≥67% of the regional population of a protected (but not Nationally Threatened or At Risk) species
<b>Category 2 site (Meets the RPS Policy 23 criteria)</b>	The site provides habitat for 5-25% of the regional population of a Nationally Threatened or At Risk species	Between four and six Nationally Threatened or At Risk species are known to be resident at or regularly using the site	The site provides seasonal or core habitat for 33-66% of the regional population of a protected (but not Nationally Threatened or At Risk) species
<b>Category 3 site (Does not meet the RPS Policy 23 criteria)</b>	The site provides habitat for <5% of the regional population of a Nationally Threatened or At Risk species	Less than four Nationally Threatened or At Risk species known to be resident at or regularly using the site	The site provides seasonal or core habitat for <33% of the regional population of a protected (but not Nationally Threatened or At Risk) species

Notes:

1. The threat rankings for bird species mentioned in this review are those listed in Robertson et al, (2017).
2. The term 'protected' refers to any species granted absolute protection under the Wildlife Act (1953).
3. Species were considered 'resident or regularly using' a site if they have been or are likely to be encountered during 50% or more of bird surveys carried out in the appropriate season.
4. Translation criteria categories for Policy 23 criterion (b): Rarity are hierarchical, so that if a site meets the criterion for category one, that takes precedence over category two, and so on. For example, a site that supports 20% of the regional population of a Nationally Endangered species would be placed in category one, but a site supporting 12% of a Nationally Endangered species would be placed in category two.