

Marsden Point Refinery: A Resource Consent Application to Renew 20 Resource Consents from the Northland Regional Council



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Prepared for: ChanceryGreen on behalf of The New Zealand Refining Company Limited, trading as 'Refining NZ'

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1. SUMMARY OF EXISTING ENVIRONMENT

1.1 CONTEXT

The following report has been prepared for Refining NZ's Re-consenting Project, specifically consents being sought for the air and water discharges, and the occupation of the Coastal Marine Area necessary for normal ongoing operations. The report below expands on the information collected for the Crude Shipping Project, supplemented by additional field surveys (March-April 2019) of coastal birds using the habitat of Mair Bank (including Marsden Bank) and from the Refinery Jetty to Northport. Draft reports from other experts listed in Section 3 below were reviewed and informed the assessment of effects on coastal birds. The report presents a summary of the existing environment as it relates to coastal birds (species, habitats, populations and values) and an assessment of effects – air discharges, water quality, marine ecological and occupation of the seabed.

1.2 AREAS OF INTEREST

The key area of interest with respect to marine discharges for the Re - consenting Project was the feeding, resting and roosting habitat in closest proximity to the Refinery i.e. the marine habitat from Northport to Marsden Point proper. In addition, potential air discharge effects were considered regarding both the foreshore and coastal edge nesting habitats between Darch Point in the west to Home Point in the east, and the nesting colony of grey-faced petrel within the Bream Bay Scenic Reserve. Water quality effects on species that feed within the water such as shags, little penguin and terns were also considered.

While I provide some discussion below regarding the relevant topography, vegetation and habitat for coastal birds within this area, it is worth at the outset commenting on the Refinery itself. The Refinery jetty was established in the early 1960's and the Refinery commenced its operations and fuel export in 1964. A major expansion in the 1980's involved a 'hydrocracker', associated feedstock plant, utility and environmental facilities, together with a pipeline connecting the Marsden Point Refinery with the Wiri Terminal in Manukau, Auckland. Today, the Refinery consists of a significant operational heavy infrastructure site, with associated transport infrastructure both within and outside the coastal marine area. Surrounding the Refinery are other infrastructural operators, including Northport and the Carter Holt Harvey LVL plant.

1.3 INFORMATION INFORMING THE ASSESSMENT

Comprehensive surveys were completed in the context of the consented Crude Shipping Project. The surveys recorded species diversity, bird numbers and habitat use activities. The specific area of habitat from Northport to Marsden Point proper was re-surveyed for this Re-consenting application to update the previous data; the coastal bird surveys completed to date (2015 to 2019) are as follows – (a) February – March 2015 and 2016 : coastal bird surveys (generally entailing 9 hourly counts per location) at Bream Bay Beach (1 survey), Mair Bank (3 surveys), Refinery Jetty to Northport (1), Marsden Point to One Tree Point (1), Part Snake Bank (1), Reotahi Bay (1), Taurikura Bay (2), Mckenzie Bay (2) and Urquharts Bay (2); (b) specific breeding season surveys in November 2015 from Mair Road to Northport and Darch Point to Home Point on the northern side of the Harbour; (c) specific surveys of little penguin use of the area adjacent to the Refinery in 2016 and 2017 – observations during daylight and at dusk; (d) 18 hourly counts over two days each in March- April 2019 at both Mair Bank and from Northport to the Refinery Jetty together with records of the use of the Refinery’s coastal structures by coastal birds.

With respect to effects on coastal birds, this report relies on the conclusions of the assessments of the independent experts engaged by Refining NZ with respect to marine ecology, water quality and terrestrial ecology (air discharge effects). These specialist reports are referenced in Section 3 below.

The Cultural Effects Assessment (CEA) report has been reviewed with respect to a reference to red-billed gulls within the Refinery; a response is provided below.

1.4 COASTAL BIRD SPECIES PRESENT

The diversity of birds using the Harbour and Harbour entrance on a regular basis is as follows with their current conservation values. The list does not include pelagic species such as shearwaters and petrels that are typically found within the wider Bream Bay area well beyond the Harbour.

TABLE 1 SPECIES OF COASTAL BIRDS TYPICALLY RECORDED IN THE BROAD AREA OF INTEREST AND THEIR CURRENT CONSERVATION STATUS (ROBERTSON, et al 2017)

COMMON NAMES	NATIONAL CONSERVATION STATUS
Australian gannet; takapu	Not threatened
Black-backed gull; karoro	Not threatened
Caspian tern; taranui	Threatened; nationally vulnerable
Eastern bar-tailed godwit; kuaka	At risk – declining

Eastern curlew	Non-resident native
Kingfisher; kotare	Not threatened
Lesser knot; huahou	Threatened; nationally vulnerable
Little penguin; korora	At risk - declining
Little shag; kawaupaka	Not threatened
Mallard	Not threatened
NZ dotterel; tuturiwhatu	At risk – recovering
Paradise shelduck; putangitangi	Not threatened
Pied shag; karuhiruhi	At risk – recovering
Pied stilt; poaka	Not threatened
Red-billed gull; tarapunga	At risk – declining
Reef heron; matuku-moana	Threatened – nationally endangered
South Island pied oystercatcher; torea	At risk – declining
Spur-winged plover	Not threatened
Variable oystercatcher; toreapango	At risk - recovering
White-faced heron	Not threatened
White-fronted tern; tara	At risk - declining

Reference – Robertson HA; Baird K; Dowding JE; Elliott GP; Hitchmough RA; Miskelly CM; Mc Arthur N; O’Donnell CFJ; Sagar PM; Scofield RP; Taylor GA May 2017. Conservation

1.5 COASTAL BIRD HABITATS

The wider Whangarei Harbour area and adjoining Bream Bay have a number of notable coastal bird features – wading bird roosts and feeding habitats from the eastern side of Northport to Marsden Bay, One Tree Point and Snake Bank; variable oystercatcher feeding habitat at Mair Bank; a number of shag nesting colonies (Motukaroro Island and Home Point); a small population of little penguin, recorded in 2016, that use the area inside Home Point for apparent breeding (but not feeding); a diverse population of pelagic birds using the open water habitat of Bream Bay; a breeding colony of grey-faced petrels within the Bream Bay Reserve; and nesting by a number of coastal bird species within the Refinery’s predator-controlled grounds.

The habitats adjacent to the Refinery are diverse and include relatively sheltered, sandy intertidal habitats, sheltered and exposed rocky shorelines, open ocean beach, open pelagic habitat of Bream Bay, islands both within the Harbour and in Bream Bay, large cliff edge pohutukawas used for nesting and the high ridgeline of Bream Head that provides nesting habitat for petrels.

1.6 COASTAL BIRD POPULATIONS AND VALUES

The two main groups of birds that have been considered in the assessment of avifaunal values are coastal birds (e.g. waders, gulls, shags) that are typically found in intertidal and nearshore habitats, and pelagic birds (eg. petrels, shearwaters) that are generally found in offshore habitats, including Bream Bay, but can occur within the Harbour environs on occasions. Throughout the wider outer Harbour and Bream Bay area a total of four nationally threatened and eighteen nationally at risk coastal and pelagic species have been recorded in the literature and the Refinery-commissioned surveys. In the area from One Tree Point east to Busby Head and in Bream Bay, the total avifaunal diversity is about 34 species.

As a result of the 2015-16 surveys and subsequent analysis, the Whangarei Harbour, Mair Bank (including Marsden Bank) at the Harbour entrance Bream Bay are considered to be of national significance with respect to their avifaunal values. Firstly, Whangarei Harbour is the third ranked wintering site in New Zealand for the endemic variable oystercatcher and the 2105, 2016 and 2019 surveys have all indicated that Mair Bank is a key feeding area particularly during low spring tide periods, even though the exposure time of the feeding habitat is relatively short. Secondly, Bream Bay is in close proximity to known seabird nesting colonies at Bream Head (fluttering shearwater), within Bream Bay Scenic Reserve (grey-faced petrel, little penguin) and the Hen and Chickens Islands (about eight species). It is also readily accessible to birds nesting at the Poor Knights and Mokohinau Islands. Bream Bay is part of a wider area proposed as a New Zealand Pelagic Important Bird Area (IBA).

To the west of the Refinery the Marsden Bay- One Tree Point - Snake Bank habitat complex is of high value in the context of the outer Harbour; it contains high tide roosts, extensive intertidal feeding habitats and is utilised by a high diversity of coastal birds including both overseas and within- New Zealand migratory species.

On the northern side of the Harbour Urquharts Bay is of high value as a coastal bird habitat in the context of the outer Harbour; a relatively high diversity of birds was recorded in the surveys and it provides both feeding and nesting habitat. The Bay is in close proximity to Mair Bank and is well utilised by shags that nest at Home Point.

The 2015 breeding season surveys documented actual and strongly inferred nesting by variable oystercatcher (at risk species), reef heron (threatened species), black-backed gull, little penguin (at

risk), little shag and pied shag (at risk). As a result of nesting by nationally threatened and at risk birds the specific locations that are considered to be of national importance during the breeding season are Reotahi Bay west, Motukaroro Island, McKenzie Bay east, Calliope Island, Urquharts Bay south and Home Point. The Marsden Point to Refinery Jetty foreshore and intertidal habitat is also utilised by NZ dotterel and variable oystercatcher for juvenile rearing. Areas within the Refinery's grounds are also used for nesting by NZ dotterel (at risk), variable oystercatcher (at risk), pied stilt, red-billed gull (at risk; 1190 pairs) and paradise shelduck. The Refinery grounds present positive habitat features that are attractive to nesting coastal birds.

The 2019 surveys in the March-April period indicated similar habitat use to previous surveys with staging, resting and high tide roosting the notable features of the Refinery Jetty to Northport area; a total of ten species were recorded with the numerical dominants being South Island pied oystercatcher (maximum of 476 individuals), red-billed gull (max. 150), white-fronted tern (max. 136) and variable oystercatcher (max. 68) with a maximum of 8 NZ dotterel and 6 caspian tern. Average numbers using the area were significantly higher during the spring tide survey than during the neap tide survey and that also applied to Mair Bank. Of note were 82 variable oystercatcher recorded staging at half tide rising; 82 were also recorded using Mair Bank.

Records of birds using the Refinery structures indicated limited and intermittent use of the Mooring Dolphins, mainly by black-backed gull, little shag, red-billed gull, with pied shag and white-fronted tern. In contrast, use of the Refinery Jetty, predominantly on the western side, was significant and consistent especially by white-fronted tern. The average tern count was c.93 individuals (n=16) with a maximum of 163. With the additional individuals using the intertidal habitat at the time added, a population of about 200 white-fronted tern was present which is significant for coastal edge habitat in this part of the Harbour. Other species using the Jetty were red-billed gull, black-backed gull and little shag. Overall the Refinery Jetty is a positive feature that is attractive to white-fronted tern in particular.

The 2019 Mair Bank surveys (including Marsden Bank that, from an avifaunal viewpoint, is functionally contiguous with Mair Bank) recorded a total of 7 species, the numerical dominants being black-backed gull with a maximum of 98, a negative feature as a result of the gull's predatory nature especially with regard to the eggs and juveniles of shorebirds; variable oystercatcher (max. 82), red-billed gull (max. 74) and South Island pied oystercatcher (max. 21). The maximum number of variable oystercatcher was significantly higher than that recorded in 2015 indicating that the quality of Mair Bank as a feeding habitat has not diminished based on the presence of a key predator. A similarly

significant increase in the maximum number of South Island pied oystercatcher was recorded mainly as a result of their use of the inner bank adjacent to the Mooring Dolphins. Overall there was a significantly higher number of birds using the Bank for feeding and resting during spring tides than during neap tides when the feeding 'window' is only of 2 - 3 hours' duration.

1.7 RESPONSE TO ISSUE RAISED IN DRAFT CULTURAL EFFECTS ASSESSMENT

The draft CEA comments on the observed presence of dead red-billed gulls at the storm water basin that is adjacent to a significant breeding colony of the gulls. It is assumed that the CEA statement refers to fledged individuals rather than small, unfledged juveniles; no date or other relevant information regarding the observations is provided.

There is no indication that the mortality of red-billed gulls is a widespread issue. No dead gulls were observed during the comprehensive coastal bird surveys undertaken by the author along the coastal strip adjacent to the colony over the 2015 to 2019 inclusive period.

Mortality of red-billed gulls has been shown to be "highest immediately upon fledging and decreases as the year progresses" and "the highest adult mortality occurred from early spring to late summer and was lowest in winter" (Mills, JA 1970 The population ecology of red-billed gulls – *Larus novae zelandiae scopulinus* – of known age, PhD thesis Univ. Canterbury 115pp).

The Refinery colony contains some 3500 to 4500 (adults plus juveniles) individuals during the nesting season and some mortality can be expected on a regular basis for a variety of reasons.

The reported mortality of red-billed gulls at the storm water basin does not alter the conclusions outlined below.

1.8 CONCLUSION

Overall, the values of the coastal avifauna in the vicinity of the Refinery and within its grounds are high indicating high quality habitats. The Refinery Jetty and the Refinery grounds provide roosting and nesting habitat respectively for nationally at risk species and represent positive aspects of the local coastal avifauna. The habitat quality of the most notable feeding habitat close to the Refinery, Mair Bank, has remained high using the presence of variable oystercatcher, the key species, as an indicator despite the reported decline of the Bank's pipi population in the last ten years. The 2019 survey showed that the population of variable oystercatcher using Mair Bank

(including Marsden Bank) has remained high indicating that it remains a nationally significant bird habitat in the context of the NZCPS.

2. ASSESSMENT OF EFFECTS

2.1 INTRODUCTION

The following assesses the effects of the existing wastewater discharges, continued discharges of site liquids, air discharges and the occupation of the Coastal Marine Area by existing jetty and associated structures on coastal birds. The opinions expressed and the conclusions reached regarding the effects of these activities on coastal birds rely on our understanding of the site (and its processes) in the context of the Whangarei Harbour and its surrounds, the various surveys of coastal birds that were conducted between 2015 and 2019 inclusive and the conclusions reached in four independent expert reports commissioned by Refining NZ as referenced below.

The assessment relates to an application for resource consents to authorise the ongoing discharge regime at the Refinery; in that regard no 'new' discharges are contemplated in the context of this assessment.

It is important to note that the present values and significance of the coastal bird populations utilising the habitats adjacent to the Refinery are in the context of about 40 to 60 years of Refinery operation. Other established heavy industry in the immediate area include Northport and the Carter Holt Harvey LVL plant.

The coastal bird species and their conservation rating; the habitat values of the Refinery and surrounds and the values of the coastal bird populations using those habitats are summarised above.

2.2 AIR DISCHARGE EFFECTS

Effects of the discharges to air from process operations at the Marsden Point refinery were reviewed with respect to coastal birds in general but specifically the elevated breeding colonies of little shags and pied shags on Motukaroro Island and at Home Point, together with the grey-faced petrel nesting colony within the Bream Bay Reserve. No other nesting colonies of either shags or petrels were present in the vicinity of the Refinery at the time of the surveys.

The Wildlands report dealt with the effects of specific potential contaminants – sulphur dioxide, sulphur, nitrogen oxides and nitrogen. With respect to sulphur dioxide, there were no detectable ecosystem effects and no birds are likely to be exposed to concentrations that could be of concern; overall there were no detectable effects on species or groups of species of interest. Close to the discharge point there was a 'minor shift away from baseline conditions' (Wildlands, 2019) based on

sensitive lichen that are sentinel species regarding sulphur dioxide contamination. Coastal birds, that are mobile (in contrast to lichens), would have a significantly lower exposure to sulphur dioxide, and other air discharges, and no adverse effects are predicted, even close to the discharge point.

Similarly, the ecosystem effects of sulphur are considered by the Wildlands report likely to be less than minor and there would not be any detectable adverse effects at a species level. With respect to nitrogen oxides there are no detectable adverse effects predicted based on measured concentrations at ecosystem, species groups or species levels. Any increased nitrogen deposition is considered to be a potential positive effect on elevated terrain such as rock stacks, headlands (e.g. shag colonies) and ridges (e.g. Bream Head Reserve grey-faced petrel colony) especially where nitrogen deposition from guano-producing seabirds or larger colonies has been reduced or lost.

The overall conclusion by Wildlands is that ‘concentrations and deposition of pollutants in the air discharges are lower than critical levels and loads at which detectable adverse ecological effects are predicted to occur for all natural areas within the receiving environment’. Tonkin and Taylor similarly determined that – ‘the air quality assessment concludes that the ongoing discharges to air from the Refinery will have a less than minor effect on the environment’. Therefore, the effects of the air discharges on coastal birds at all life stages are considered to be less than minor; there would be no adverse effects on the diversity, abundance or breeding potential of coastal birds within the receiving environment.

2.3 WASTEWATER DISCHARGE EFFECTS – WATER QUALITY

Streamlined Environmental assessed the water and sediment quality and reported on bioassay testing. Those aspects are of relevance to coastal birds with respect to potential effects on their intertidal food resources, effects on the subtidal marine environment including fish populations and the ability of visual-feeding diving birds (e.g. gannet, shags and terns) to locate and capture prey.

The water quality assessment indicated that the receiving environment was well-oxygenated with a normal pH, stable temperature regime and low concentrations of ammoniacal nitrogen, metals, metalloid, phenol, total petroleum hydrocarbons, sulphides and total suspended solids. There was no water quality constituent concentration that was of concern regarding the habitat or feeding behaviour and efficiency of coastal birds. Similarly, under normal operating conditions, it is highly unlikely that any process chemical formulations could have adverse effects beyond the mixing zone that could be detrimental to coastal birds, while the sediment quality is also high and does not indicate adverse effects on aquatic organisms. Groundwater moving from the Refinery site towards

the coastal edge undergoes a high level of contaminant reduction to the extent that the probability of any effect on coastal birds using the Northport to Marsden Point shoreline is negligible. The key avifaunal value of the beach from Northport to Marsden Point is as a resting and high tide roosting area rather than as a feeding habitat. Similarly, the section of Bream Bay Beach to Mair Road to the south east of Marsden Point is not a notable feeding habitat and that is the typical situation for c.30 km to Bream Tail. The re-consenting will have no effect on these present values.

A water quality conclusion of particular interest regarding birds using Mair Bank for feeding is that the storm water basin (SWB) water was found to be non-toxic to pipi at almost no dilution. Pipi colonising Mair Bank are predated by a nationally significant population of variable oystercatcher as well as other species. While there has been a documented decline of the Mair Bank pipi population over the last ten years (Kerr, 2019), the precise cause of which has not been determined, the recent (2015-2019) avifauna surveys indicate that the numbers of variable oystercatchers feeding on the Bank have remained high. Any changes in the water quality over Mair Bank (including Marsden Bank) would have a negligible effect on coastal birds. The re-consenting would not change that situation or decrease the significance of the Bank to variable oystercatcher.

2.4 WASTEWATER DISCHARGE EFFECTS – MARINE ECOLOGICAL VALUES

The Boffa Miskell report addressed effects on marine ecological values. It concluded that the marine ecological values at and adjacent to the Refinery Jetty, the potentially highest impact zone, were high. Surface sediment quality was also high with low levels of contaminants, and there were similarly low levels of contaminants in pipi and cockle analysed by the NRC over the 2003-12 period.

Addressing the SWB water discharge effects, a potential area of ponded discharge water at low tide was identified by Boffa Miskell between the shoreline and the edge of Marsden Bank. The conclusion was that there could potentially be an adverse effect within a small pooled area, but that that effect would only apply in the case of extended exposure to sensitive life stages (e.g. larval forms) of sensitive species. That particular pool is within the survey area for coastal birds using Mair Bank and it is clear from a number of surveys, including March-April 2019, that it is a well-utilised feeding area for coastal birds, especially variable oystercatcher, and if any effects have resulted, they have been less than minor in the context of the Bank's habitat.

The report concluded that, having addressed the marine ecological effects using a robust database, including the effects of the various discharges, cumulative effects and occupation of the seabed, there is "no evidence of adverse effects on marine ecological values within the receiving

environment". The implications to coastal birds are that there will be no adverse effects on the diversity and abundance of their food organisms and therefore no effect on the viability of local coastal bird populations or their ability to nest and raise juveniles.

2.5 EFFECTS OF OCCUPATION OF THE SEABED

Coastal birds utilising the Refinery structures were recorded in the March- April 2019 field assessment. Intermittent use of the Mooring Dolphins and Refinery Jetty was recorded and clearly those structures provide attractive resting and roosting habitats for a variety of coastal birds. The most notable example was the use of the western side of the Refinery Jetty by significant numbers of white-fronted tern, an at risk species. We therefore conclude that the Refinery structures located within the CMA have an overall positive effect, due to being coastal bird habitat features used by white-fronted tern in particular.

2.6 CONCLUSION

Based on the detailed assessments of the various independent experts engaged by Refining NZ to consider effects of the air discharges, wastewater and other liquid discharges; their resulting conclusions regarding existing water and sediment quality, toxicity testing and the occupation of the seabed; and the information gained from the various coastal bird surveys undertaken over the period 2015-2019, the effects of the consenting on coastal birds at all their life stages is considered negligible.

That conclusion applies to the effects of air discharges, wastewater discharges (considering both water quality and marine ecology) and the occupation of the seabed as discussed above. Overall there is no demonstrable or predicted effect on the habitat of coastal birds that could adversely affect their feeding, resting, roosting or breeding.

Furthermore, the Refinery Jetty and associated structures in the CMA provide well-used roosting habitat which is an overall positive effect. Similarly, there is no evidence that the Refinery complex itself has a significant adverse effect on coastal birds. Instead, by providing resting, roosting and nesting habitat for species that are considered to be at risk on a national basis we consider it has an overall positive effect.

No avoidance or remediation measures are required regarding coastal birds. Similarly, no regular monitoring is recommended with respect to consenting.

3. REFERENCES

Boffa Miskell

2019 Assessment of Effects on Marine Ecological Values

Kerr, V 2019 Ecological Monitoring Maintenance Dredging Programme 2019, Refining NZ

Streamlined Environmental

2019 Water quality assessment at Marsden Point oil refinery to inform resource consent renewal applications

Tonkin and Taylor Ltd

2019 Air Quality Assessment

Wildland Consultants

2019 Assessment of ecological effects of air discharges from the Marsden Point Oil Refinery

Bioresearches

2019 Re-consenting 2022 – Coastal Bird Assessment March – April 2019 (For Refining NZ) 59pp