

New Zealand

Firth of Thames

Offline RIS Word form

[Copy of online form submitted through RSIS portal on 2 February 2022.]  
  
All fields marked with an asterisk (\*) are required.  
  
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Color codes

Fields back-shaded in light blue relate to data and information required only for RIS updates.

Note that some fields concerning aspects of Part 3, the Ecological Character Description of the RIS (tinted in purple), are not expected to be completed as part of a standard RIS, but are included for completeness so as to provide the requested consistency between the RIS and the format of a ‘full’ Ecological Character Description, as adopted in Resolution X.15 (2008). If a Contracting Party does have information available that is relevant to these fields (for example from a national format Ecological Character Description) it may, if it wishes to, include information in these additional fields.

Summary

1.1 Summary description

Please provide a short descriptive text summarising the key characteristics and internationally important aspects of the site. You may prefer to complete the four following sections before returning to draft this summary.

Summary (This field is limited to 2500 characters)

|  |  |
| --- | --- |
|  | The Firth of Thames (Tikapa Moana) is a shallow marine embayment (semi-enclosed bay) that lies in the northern part of the Hauraki Basin, in New Zealand’s North Island. The Ramsar site occupies the southern section of the Firth, from Pūkorokoro Miranda in the north-west to the Waihou River mouth in the south-east, and includes most of its approximately 8220 hectares of exposed intertidal bird feeding grounds and shellbanks.    This site is one of the terminal points for the East Asian-Australasian flyway, and one of the three most important coastal stretches for wading birds in New Zealand, supporting over 20,000 birds per year, most of which are migratory. The flyway is used by shorebirds that migrate from winter in Siberia and Alaska to feed during summer in the southern hemisphere, and later return between March and June to their northern breeding grounds. These include bar-tailed godwits (Limosa lapponica), red knots (Calidris canutus), ruddy turnstone (Arenaria interpres), Pacific golden plovers (Pluvialis fulva), sharptailed sandpipers (Calidris acuminata), and whimbrels (Numenius phaeopus). It is also an important wintering site for national migrants including pied stilts (Himantopus himantopus), wrybills (Anarhynchus frontalis) and pied oystercatchers (Haematopus finschi).    The Firth is also of international importance for the presence of the Miranda chenier plain (a series of shelly beach ridges separated by mudflats), and is regarded as one of the best examples worldwide of an active chenier system.    The Ramsar Site includes wetland and estuarine habitats for many other coastal birds such as white-faced heron (Ardea novaehollandiae), banded rail (Gallirallus philippensis), cormorants/shags (Phalacrocorax spp. and Strictocarbo sp.), and occasional white heron (Ardea alba). The shellbanks provide vital roosting sites for large numbers of shorebirds, but are also important as breeding sites for up to 1000 pairs of white-fronted terns (Sterna striata) at Taramaire, black-billed gulls (Larus bulleri) at Pūkorokoro Miranda, three species of shags that nest mainly in the fringing mangroves, variable oyster catchers (Haematopus unicolor) and a few pairs of the nationally vulnerable northern New Zealand dotterel (Charadrius obscurus aquilonius). |

Data & location

2.1 Formal data

2.1.1 Name and address of the compiler of this RIS

Responsible compiler

Name

|  |  |
| --- | --- |
|  | Karen Denyer |

Institution/agency

|  |  |
| --- | --- |
|  | Consultant for Department of Conservation |

Postal address (This field is limited to 254 characters)

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| --- | --- |
|  |  |

National Ramsar Administrative Authority

Name

|  |  |
| --- | --- |
|  | Mailee Stanbury |

Institution/agency

|  |  |
| --- | --- |
|  | Department of Conservation |

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|  |  |
| --- | --- |
|  |  |

2.1.2 Period of collection of data and information used to compile the RIS

From year (The online RIS only accepts numeric values)

|  |  |
| --- | --- |
|  | 2004 |

Period when the data and information for the sheet for a newly designated site was compiledFor updated RIS: Period when the data and informationfor revision of an existing sheet was updated

To year (The online RIS only accepts numeric values)

|  |  |
| --- | --- |
|  | 2018 |

2.1.3 Name of the Ramsar Site

Official name (in English, French or Spanish)\* (This field is mandatory)

|  |  |
| --- | --- |
|  | Firth of Thames |

Unofficial name (optional)

|  |  |
| --- | --- |
|  | Tikapa Moana |

2.1.4 Changes to the boundaries and area of the Site since its designation or earlier update

A. Changes to Site boundary (Update)

[x] Yes / [ ] No

.

[x] The boundary has been delineated more accurately

[ ] The boundary has been extended

[ ] The boundary has been restricted

B. Changes to Site area (Update)

|  |  |
| --- | --- |
|  | the area has increased[[1]](#footnote-1) |

[ ] The Site area has been calculated more accurately

[x] The Site has been delineated more accurately

[ ] The Site area has increased because of a boundary extension

[ ] The Site area has decreased because of a boundary restriction

Important note: If the boundary of the designated site is being restricted/reduced, before submitting this updated RIS to the Secretariat the Contracting Party should have followed: - the requirements in Article 2.5 of the Convention; or - the procedures established by the Conference of the Parties in the annex to Resolution VIII.20 (2002); or - where appropriate instead, the procedures in the annex to Resolution IX.6 (2005). Contracting Parties should also have provided to the Secretariat a report on changes prior to the submission of an updated RIS.

[ ] For secretariat only: This update is an extension

2.1.5 Changes to the ecological character of the Site

6b i. Has the ecological character of the Ramsar Site (including applicable Criteria) changed since the previous RIS? (Update)

|  |  |
| --- | --- |
|  | Yes -actual-[[2]](#footnote-2) |

Are the changes (Update)

[ ] Positive / [ ] Negative / [x] Positive & Negative

.

.

What extent of the Ramsar site is affected (%)

Positive % (Update)

|  |  |
| --- | --- |
|  | 1 |

Negative % (Update)

|  |  |
| --- | --- |
|  | 1 |

Optional text box to provide further information (Update)

|  |  |
| --- | --- |
|  | Changes are both positive and negative, and affect different proportions of the Ramsar site, therefore it is not possible to estimate the % of the site positively or negatively affected. |

[ ] No information available

Are changes the result of (tick each category which applies):

[x] Changes resulting from causes operating within the existing boundaries?

[x] Changes resulting from causes operating beyond the site’s boundaries?

[ ] Changes consequent upon site boundary reduction alone (e.g., the exclusion of some wetland types formerly included within the site)?

[ ] Changes consequent upon site boundary increase alone (e.g., the inclusion of different wetland types in the site)?

Please describe any changes to the ecological character of the Ramsar Site, including in the application of the Criteria, since the previous RIS for the site. (Update)

|  |  |
| --- | --- |
|  | Negative change (actual)    • An estimated 430,000 tonnes per year of sediment deposits in the southern Firth of Thames, with approximately 40% of the load from contributing catchments (Green & Zeldis 2015). Sediments are accumulating in some areas of the intertidal flats at rates 2-10 times greater than 90 years earlier and result in altered wetland ecosystem processes (sediment regime).    • Roosting and feeding habitat for birds on open sand and mudflats has been diminished through expansion of dense stands of mangroves into the southern Firth, affecting habitat for a variety of waders. Displacement has been particularly noticeable for wrybills (Anarhynchus frontalis), golden plovers (Pluvialis fulva), red knots (Calidris canutus) and whimbrels (Numenius phaeopus), although international population decrease may be a more significant factor in declining numbers of transnational species at the Ramsar Site.    • Wader counts over the period 2004 to 2017 show a decline in average number of wading birds visiting the site, from a high of 35,000 in 2005 to 22,000 in 2017 (summed winter and summer counts). Winter counts show a small decline, with a greater decline for summer counts, indicating that transnational migrant numbers are declining more than national migrant numbers. Counts show a sharp decrease in the number of red knots visiting the site, from around 6000 in 2004 to fewer than 2000 in 2017. This species is threatened by extensive land reclamation overseas, reduced prey availability, pollution and human disturbance.    • Other species that have shown a downwards trend since 2004 include South Island Pied Oystercatchers, pied stilts and ruddy turnstones. South Island pied oystercatcher counts declined from a peak in 2005 of 17,000 birds, to annual numbers of around 10,000 in recent years. Habitat modification, water extraction and agricultural intensification in their breeding areas are commonly highlighted as potential causes.    • Three introduced species have been recorded in the Ramsar site in recent years - the Australian oyster blenny (Omobranchus anolius), greentail prawn (Metapenaeus bennettae) and Australian dog whelk (Tritia burchardi).    Negative change (potential)    • Sea level is currently rising faster than it has at any time in the last 5000 years and is contributing to shoreline erosion around Kaiaua in the northern part of the Ramsar Site. This may affect the chenier accretion, however the supply of sand and shell to the southern end of the plain is currently outstripping the erosive effects of sea level rise.    • The Waikato Regional Council monitors two benthic plots in the Ramsar site (and another three in the Firth beyond the Ramsar site boundary) at least annually. There were no significant changes in sediments or benthic organisms across the Firth as a whole during the monitoring period (2001-2015), however one of the monitoring sites within the Ramsar sites showed a community shift towards more mud-tolerant species, indicative of increasing sedimentation. Although, at an estuary wide scale, there was little evidence of ecologically significant changes between 2001 and 2010.    • An increasing trend for sediment chlorophyll-a content (indicative of the amount of benthic microalgae) has been detected, indicating a potential estuary-wide shift over time.    • Since 2004, several alien marine species have been detected in the Hauraki Gulf including a bryozoan (Amathia semiconvoluta), two seaweeds (Vaucheria sp. and Undaria pinnatifida), a polychaete worm (Polydora cornuta), a fan worm (Sabella spallanzanii), three ascidians (Styela clava, Eudistoma elongatum and Caprella scauroides), a crab (Charybdis japonica) and a caprellid amphipod (Botrylloides giganteum). These species have not to date been reported in the Ramsar Site but may pose a threat to indigenous marine life where conditions are suitable for them to establish.    • Extreme floods in autumn of 2017 inundated areas of saltmarsh including sites supporting the at risk native musk Thyridia repens. The floods introduced a significant pulse of sediments, nutrients and other contaminants.    • Aquaculture reforms in 2011 allow for an additional 1100 tonnes of nitrogen per year to be discharged into the Firth of Thames from finfish farms in sites north of the Ramsar site. These farms are yet to be developed and the impact on the Firth is unknown.    • High temperatures and habitat degradation appear to contribute to outbreaks of botulism and algal blooms in the vicinity of the site, with negative effects on bird and fish populations    Positive change (actual)    • Regular monitoring of water quality in the major streams discharging to the Firth show water quality has remained broadly stable or improved over last 25 years, albeit at higher levels than ecological and swimming guidelines for many parameters, and with minor improvements in nutrient loads. The effects of more intensive farming appear to have been offset by improved treatment of sewage and industrial wastewaters, and presumably, by improved management on farms (e.g. spray-irrigation of dairy shed effluent to land instead of discharging it to water).    • Collectively, the rivers draining the Hauraki Plains carry about 3730 tonnes per year of nitrogen and 206 tonnes per year of phosphorus to the Firth of Thames, among the highest rates in New Zealand. During 2006–2015 the combined load of nitrogen carried by the Hauraki rivers decreased at a rate of about 1.2 % per year, while the combined load of phosphorus decreased at a rate of about 3.1 % per year. The monitoring sites are well upstream of the river mouths (for example on the Waihou River 45 km in a straight line) and may not represent the state of water entering the Firth.    • Since 2004, annual wader counts have shown a slight increase in the number of New Zealand dotterels, banded dotterels and wrybills, although New Zealand dotterels in the Ramsar Site remain as low as 20 to 40 per year with very few breeding pairs. Counts of the endemic wrybill slowly declined in the Firth of Thames between the mid-1960s and 2010, however from 2004 to 2016 they experienced a slight upward trend in annual counts from around 1600 to 2300 birds, with an average of around 2100 annually.    • An old capped landfill (household waste disposal) site near Kaiaua that had become exposed by coastal erosion was excavated and removed offsite in 2016, reducing risk of marine pollution.      Note:    The Hauraki Gulf marine spatial planning process known as Sea Change – Tai Timu Tai Pari aims to improve the integrated management of the Gulf, including the Ramsar site.    Living Water, an industry-government partnership was launched in 2013 by dairy cooperative Fonterra and the Department of Conservation to improve biodiversity and water quality across New Zealand, with a focus on five catchments, including Pūkorokoro Miranda catchment which flows to the Ramsar Site. Its 2015-2018 strategic plan for this site aims to invest NZ $1.25 million towards: 1) protecting and expanding shorebird habitat, 2) supporting advocacy to protect international flyway sites and 3) showcasing examples of sustainable dairy farming practices in the catchment. Specific actions underway include leading or supporting advocacy, research, farm plans, enhancement of visitor facilities, and habitat enhancement including invasive species control, planting and land purchase to create additional secure high tide roost sites. |

Is the change in ecological character negative, human-induced AND a significant change (above the limit of acceptable change) (Update)

[ ] Yes / [x] No

.

Has an Article 3.2 report been submitted to the Secretariat? (Update)

[ ] Yes / [x] No

.

2.2 Site location

2.2.1 Defining the Site boundaries

The site boundaries must be clearly delineated on both: a) a GIS shapefile and b) a digital map/image:

-> To define the site boundaries please complete field 2.2.1 a1), 2.2.1 a2) and 2.2.1 b) via the online form.

-UPLOAD via online form-

Boundaries description (This field is limited to 2500 characters)

|  |  |
| --- | --- |
|  | The Firth of Thames Ramsar Site comprises the intertidal area of the southern and western shores of the Firth of Thames between Kaiaua and the west bank of the Waihou River near Thames. The margins of the Ramsar site are defined by the extremes of mean low water spring tides (MLWS), and mean high water springs (MHWS). |

2.2.2 General location

a) In which large administrative region does the site lie?

|  |  |
| --- | --- |
|  | Waikato Region |

b) What is the nearest town or population centre?

|  |  |
| --- | --- |
|  | Pūkorokoro Miranda |

2.2.3 For wetlands on national boundaries only

a) Does the wetland extend onto the territory of one or more other countries?

[ ] Yes / [x] No

.

b) Is the site adjacent to another designated Ramsar Site on the territory of another Contracting Party?

[ ] Yes / [x] No

.

c) Is the site part of a formal transboundary designation with another Contracting Party?

[ ] Yes / [x] No

.

d) Transboundary Ramsar Site name:

|  |  |
| --- | --- |
|  |  |

Sites part of transboundary designation

2.2.4 Area of the Site

If you have not established an official area by other means, you can copy the area calculated from the GIS boundaries into the 'official area' box.

Official area, in hectares (ha): (The online RIS only accepts numeric values)

|  |  |
| --- | --- |
|  | 8213 |

Area, in hectares (ha) as calculated from GIS boundaries

|  |  |
| --- | --- |
|  | 8212.956 |

2.2.5 Biogeography

Please provide the biogeographic region(s) encompassing the site and the biogeographic regionalization scheme applied:

Biogeographic regions

|  |  |
| --- | --- |
| **Regionalisation scheme(s)**[[3]](#footnote-3) | **Biogeographic region** |
| Marine Ecoregions of the World (MEOW) | Temperate Australasia realm |
|  |  |

Other biogeographic regionalisation scheme (This field is limited to 2500 characters)

|  |  |
| --- | --- |
|  |  |

Why is the Site important?

3.1 Ramsar Criteria and their justification

Tick the box against each criterion applied to the designation of the Ramsar Site. All criteria which apply should be ticked. Please explain why you selected a criterion by filling in the relevant fields on this page, on the three other pages of this section 'Criteria & justification' and on the 'Wetland types' page of the section 'What is the site like?'.

[x] Criterion 1: Representative, rare or unique natural or near-natural wetland types

To justify this Criterion, please select at least one wetland type as representative, rare or unique in the section What is the site like? > Wetland types and provide further details in at least one of the three boxes below.

Hydrological services provided (This field is limited to 3000 characters)

|  |  |
| --- | --- |
|  | The primary hydrological value of the wetland is in providing a habitat and food source for avifauna and fish. |

Other ecosystem services provided (This field is limited to 3000 characters)

|  |  |
| --- | --- |
|  | The Ramsar site supports a broad range of ecosystem services. This includes mitigating potential coastal erosion and inundation hazards that exist for the low-lying Hauraki Plains, providing nursery habitat and maintaining coastal ecosystem food webs to support the important recreational and commercial fisheries of the Firth of Thames, regulating water quality (e.g. through mangroves trapping and cycling sediment and nutrients), supporting leisure and recreation (e.g. bird watching) and helping conserve the cultural and natural heritage of Tikapa Moana.    The wetland helps maintain coastal resilience as mangroves help mitigate wave-induced coastal erosion and inundation of farmland and infrastructure, including areas that are 0.1 m below MSL. |

Other reasons (This field is limited to 3000 characters)

|  |  |
| --- | --- |
|  | Representative examples of two wetland types: coastal mangrove forest and Holocene chenier plain.    The site contains one of the largest contiguous areas of open coast mangrove (Avicennia marina subsp. australasica) forest in New Zealand. Bands up to 900 m wide stretch unbroken for over 20 km along most of the western coast and all of the southern coast of the Ramsar site. Few other vascular plants species typically occur with the mangroves, but they include (on slightly higher ground), shrubs of salt marsh ribbonwood (Plagianthus divaricatus), mingimingi (Coprosma propinqua) and pohuehue (Muehlenbeckia complexa), with sparse ground cover of glasswort (Sarcocornia quinquefolia). The tall trees lining the main rivers provide important roosting sites for pied and little shags, while the height and openness of the canopy in places allows dense sea meadow communities (e.g. S. quinquefolia associations) to coexist, increasing floristic diversity.    The site contains part of the Miranda chenier plain, which extends for 17 km south on the western shore of the Firth. This chenier is probably the best example globally of a Holocene coastal strand plain accreted by a combination of gravel and shell that overlie intertidal mud. It is the most extensive chenier plain system in New Zealand, and is the only known example, globally, of a chenier plain that is currently aggrading (at a rate of 50 m southwards per year). |

[x] Criterion 2 : Rare species and threatened ecological communities

To justify this Criterion, please give details below on:

- relevant plant species in the section Criteria & justification> Plant species (3.2)

- relevant animal species in the section Criteria & justification> Animal species (3.3)

- relevant ecological communities in the section Criteria & justification> Ecological communities (3.4)

Optional text box to provide further information (This field is limited to 3000 characters)

|  |  |
| --- | --- |
|  | Nationally critical species include: black-billed gull (Larus bulleri), Australasian bittern (Botaurus poiciloptilus), and black stilt (Himantopus novaezelandiae).    Nationally vulnerable species include: wrybill (Anarhynchus frontalis), banded dotterel (Charadrius bicinctus bicinctus), Caspian tern (Hydroprogne caspia), and red knot (Calidris canutus rogersi). |

[x] Criterion 3 : Biological diversity

To justify this Criterion, please give details in the box below. If you want to name any specific species, please give details on:

- relevant plant species in the section Criteria & justification> Plant species (3.2)

- relevant animal species in the section Criteria & justification> Animal species (3.3)

Justification (This field is limited to 3000 characters)

|  |  |
| --- | --- |
|  | The Firth of Thames area supports particularly dense populations of shorebirds for the amount of inter- tidal habitat available. Seventy four shorebird species, many rare or uncommon, have been recorded at this site. These include one grebe, five cormorants, four herons, one spoonbill, seven members of the Anatidae family, one gallinule, two oystercatchers, six plover, 27 members of the Scolopacidae (curlews, whimbrels, godwits, snipes and sandpipers), two stilts, two skuas and seven gulls and terns.    A ‘Bioblitz’ held on 28 February 2013 recorded 1,132 species or ‘recognisable taxonomic units’ across 69 classes of animals, vascular and non-vascular plants, invertebrates and bacteria. |

[x] Criterion 4 : Support during critical life cycle stage or in adverse conditions

To justify this Criterion, please give details below on:

- relevant plant species in the section Criteria & justification> Plant species (3.2)

- relevant animal species in the section Criteria & justification> Animal species (3.3)

and explain the life cycle stage or nature of adverse conditions in the accompanying 'justification' box.

Optional text box to provide further information (This field is limited to 3000 characters)

|  |  |
| --- | --- |
|  | The Firth of Thames is a crucial seasonal refuge and feeding ground for many national and transnational migratory birds as part of the East Asian-Australasian flyway. The flyway is used by shorebirds that migrate from winter in Siberia and Alaska to summer in the southern hemisphere, and later return between March and June to their northern breeding grounds. As a terminus for migrating waders, it is of great importance that the Firth ecosystem continues to provide abundant food (benthic invertebrates), protection from predators, sheltered roosting areas and high water quality.    It is the most important wintering site nationally for pied stilts (Himantopus himantopus) and sharptailed sandpipers (Calidris acuminata), the second most important wintering site for wrybills (Anarhynchus frontalis) and whimbrels (Numenius phaeopus), and the third most important wintering site for pied oystercatchers (Haematopus finschi). |

[x] Criterion 5 : >20,000 waterbirds

To justify this Criterion, please give details below on:- the total number of waterbirds and the period of data collection - relevant waterbird species, and if possible their population size, in the section Criteria & justification> Animal species (3.3)

Overall waterbird numbers\* (This field is mandatory)

|  |  |
| --- | --- |
|  | 25700 |

Start year\* (This field is mandatory)

|  |  |
| --- | --- |
|  | 2004 |

End year\* (This field is mandatory)

|  |  |
| --- | --- |
|  | 2017 |

Source of data:

|  |  |
| --- | --- |
|  | Annual Wader Census reports, Ornithological Society of New Zealand, www.osnz.org.nz/national-wader-count. |

Optional text box to provide further information (This field is limited to 3000 characters)

|  |  |
| --- | --- |
|  | Data are the sums of winter and summer wading bird counts to ensure seasonal migrants are included. Since 2004 total annual counts have fluctuated from a high of 35,000 waders in 2005 to a low of almost 20,000 in 2015. Excludes counts from Kawakawa Bay (north of the Ramsar site). Average total summer and winter counts from 2004 to 2017 are 25700 birds. |

[x] Criterion 6 : >1% waterbird population

To justify this Criterion, please give details on relevant waterbird species and their population size in the section Criteria & justification> Animal species (3.3)

Optional text box to provide further information (This field is limited to 3000 characters)

|  |  |
| --- | --- |
|  | The Firth supports more than 1% of the bioregional populations of northern New Zealand dotterel (Charadrius obscurus), black and hybrid stilt (Himantopus novaezelandiae), wrybill (Anarhynchus frontalis), South Island pied oystercatcher (Haematopus ostralegus), variable oystercatcher (Haematopus unicolor), pied stilt (Himantopus himantopus) and eastern bar-tailed godwit (Limosa lapponica). |

[ ] Criterion 7 : Significant and representative fish

To justify this Criterion, please give information in the box below and details of relevant fish species in the section Criteria & justification> Animal species (3.3)

Justification (This field is limited to 3000 characters)

|  |  |
| --- | --- |
|  |  |

[ ] Criterion 8 : Fish spawning grounds, etc.

To justify this Criterion, please give information in the box below. Completion of details on relevant fish species in the section Criteria & justification> Animal species (3.3) is optional.

Justification (This field is limited to 3000 characters)

|  |  |
| --- | --- |
|  |  |

[ ] Criterion 9 : >1% non-avian animal population

To justify this Criterion, please give details on relevant non-avian species and their population size in the section Criteria & justification> Animal species (3.3)

Optional text box to provide further information (This field is limited to 3000 characters)

|  |  |
| --- | --- |
|  |  |

3.2 Plant species whose presence relates to the international importance of the site

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Phylum** | **Scientific name**\* | **Criterion 2** | **Criterion 3** | **Criterion 4** | **IUCN Red List**[[4]](#footnote-4) | **CITES Appendix I** | **Other status** | **Justification** |
| Birds | | | | | | | | |
| Tracheophyta / Liliopsida | Apodasmia similis | [ ] | [x] | [ ] |  | [ ] |  | Endemic species (NZ) |
| Tracheophyta / Magnoliopsida | Avicennia marina australasica | [ ] | [ ] | [x] |  | [ ] |  | One of largest areas of mangrove habitats in NZ |
| Tracheophyta / Magnoliopsida | Plagianthus divaricatus | [ ] | [x] | [ ] |  | [ ] |  | Endemic species (NZ) |
| Tracheophyta / Magnoliopsida | Selliera radicans | [ ] | [x] | [ ] |  | [ ] |  | Endemic species (NZ) |
| Tracheophyta / Magnoliopsida | Suaeda novae-zelandiae | [ ] | [x] | [ ] |  | [ ] |  | Endemic species (NZ) |
|  |  | [ ] | [ ] | [ ] |  | [ ] |  |  |

GBIF Secretariat (2019). GBIF Backbone Taxonomy. Checklist dataset https://doi.org/10.15468/39omei accessed via GBIF.org on 2020-07-15.

Optional text box to provide further information on plant species of international importance:

(This field is limited to 3000 characters)

|  |  |
| --- | --- |
|  | Note: The conservation of mangroves within the site is important due to the ecosystem services they support, and as one of the best examples of a mangrove forest in New Zealand. However, mangrove expansion into other important wetland habitats (e.g. mudflats) that provide important feeding areas for birds is a threatening process.    Endemic species status for qualification under Criterion 3 is based on the New Zealand Plant Conservation Network database. |

3.3 Animal species whose presence relates to the international importance of the site

Animals are listed in the following order: birds; fish, mollusc and curstaceen; other animals

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Phylum** | **Scientific name**\* | **Species qualifies under criterion** | | | | **Species contributes under criterion** | | | | **Pop. Size**[[5]](#footnote-5) | **Period of pop. Est.**5 | **% occurrence**5 | **IUCN Red List**[[6]](#footnote-6) | **CITES Appendix I** | **CMS Appendix I** | **Other Status** | **Justification** |
| **2** | **4** | **6** | **9** | **3** | **5** | **7** | **8** |
| Fish, Mollusc and Crustacea | | | | | | | | | | | | | | | | | |
| Chordata / Actinopterygii | Anguilla dieffenbachii | [x] | [x] | [ ] | [ ] | [x] | [ ] | [ ] | [ ] |  |  |  | EN | [ ] | [ ] | At Risk (Declining) | Endemic species (NZ). Important migratory pathway and habitat for this species in this catchment |
| Chordata / Actinopterygii | Galaxias maculatus | [ ] | [x] | [ ] | [ ] | [ ] | [ ] | [ ] | [ ] |  |  |  | LC | [ ] | [ ] | At Risk (Declining) | Important migratory pathway and habitat for this diadromous species in this catchment. |
| Chordata / Actinopterygii | Galaxias postvectis | [x] | [x] | [ ] | [ ] | [x] | [ ] | [ ] | [ ] |  |  |  | EN | [ ] | [ ] | Nationally vulnerable | Endemic species (NZ). Important migratory pathway and habitat for this diadromous species in this catchment |
| Birds | | | | | | | | | | | | | | | | | |
| Chordata / Aves | Anarhynchus frontalis | [x] | [x] | [x] | [ ] | [x] | [x] | [ ] | [ ] | 2100 | 2004-2017 | 45 | VU | [ ] | [ ] | Nationally vulnerable | Endemic species Second most important wintering site nationally. WPE 1% threshold is 45-50 individuals |
| Chordata / Aves | Arenaria interpres | [ ] | [x] | [ ] | [ ] | [ ] | [x] | [ ] | [ ] |  |  |  | LC | [ ] | [ ] | Migrant | Important wintering site during life-cycle of migratory species. |
| Chordata / Aves | Botaurus poiciloptilus | [x] | [ ] | [ ] | [ ] | [ ] | [ ] | [ ] | [ ] |  |  |  | EN | [ ] | [ ] | Nationally critical |  |
| Chordata / Aves | Calidris acuminata | [ ] | [x] | [ ] | [ ] | [ ] | [x] | [ ] | [ ] |  |  |  | LC | [ ] | [ ] |  | Most important wintering site (nationally) during life-cycle of migratory species |
| Chordata / Aves | Calidris canutus rogersi | [x] | [x] | [ ] | [ ] | [ ] | [x] | [ ] | [ ] |  |  |  |  | [ ] | [x] | Nationally vulnerable | Important site during life-cycle of migratory species. |
| Chordata / Aves | Calidris ferruginea | [ ] | [x] | [ ] | [ ] | [ ] | [x] | [ ] | [ ] |  |  |  | NT | [ ] | [ ] | Vagrant | Important site during life-cycle of migratory species. |
| Chordata / Aves | Calidris ruficollis | [ ] | [x] | [ ] | [ ] | [ ] | [x] | [ ] | [ ] |  |  |  | NT | [ ] | [ ] | Migrant | Important site during life-cycle of migratory species. |
| Chordata / Aves | Charadrius obscurus | [x] | [ ] | [x] | [ ] | [x] | [x] | [ ] | [ ] | 22 | 204-2017 | 2 | CR | [ ] | [ ] | At Risk (Recovering) | Endemic species (NZ). WPE 1% threshold is 15 individuals |
| Chordata / Aves | Gallirallus philippensis assimilis | [ ] | [ ] | [ ] | [ ] | [ ] | [x] | [ ] | [ ] |  |  |  | LC | [ ] | [ ] | At Risk (Declining) |  |
| Chordata / Aves | Haematopus finschi | [ ] | [ ] | [x] | [ ] | [x] | [x] | [ ] | [ ] | 9300 | 2004-2017 | 9 |  | [ ] | [ ] | At Risk (Declining) | Endemic species (NZ). WPE 1% threshold is 1000 individuals |
| Chordata / Aves | Haematopus unicolor | [ ] | [ ] | [x] | [ ] | [x] | [x] | [ ] | [ ] | 120 | 2004-2017 | 3 | LC | [ ] | [ ] | At Risk (Declining) | Endemic species (NZ). WPE 1% threshold is 45 individuals |
| Chordata / Aves | Himantopus himantopus | [ ] | [x] | [x] | [ ] | [ ] | [x] | [ ] | [ ] | 3600 | 2004-2017 | 12 | LC | [ ] | [ ] |  | WPE 1% threshold is 300 individuals, important wintering site |
| Chordata / Aves | Himantopus novaezelandiae | [x] | [x] | [x] | [ ] | [x] | [ ] | [ ] | [ ] | 3 | 2004-2017 | 3 | CR | [ ] | [ ] | Nationally critical | Important wintering site. Endemic species (NZ). WPE 1% threshold is 1 individual |
| Chordata / Aves | Hydroprogne caspia | [x] | [ ] | [ ] | [ ] | [ ] | [ ] | [ ] | [ ] |  |  |  | LC | [ ] | [ ] | Nationally vulnerable |  |
| Chordata / Aves | Larus bulleri | [x] | [ ] | [ ] | [ ] | [ ] | [ ] | [ ] | [ ] |  |  |  | EN | [ ] | [ ] | Nationally critical |  |
| Chordata / Aves | Limosa lapponica baueri | [ ] | [x] | [x] | [ ] | [ ] | [x] | [ ] | [ ] | 6300 | 2004-2017 | 5 |  | [ ] | [ ] | At Risk (Declining) | Important site during life-cycle of migratory species. WPE 1% threshold is 1300 individuals. |
| Chordata / Aves | Numenius madagascariensis | [x] | [ ] | [ ] | [ ] | [ ] | [ ] | [ ] | [ ] |  |  |  | EN | [ ] | [x] |  |  |
| Chordata / Aves | Numenius phaeopus | [ ] | [x] | [ ] | [ ] | [ ] | [x] | [ ] | [ ] |  |  |  | LC | [ ] | [ ] |  | Important site during life-cycle of migratory species. |
| Chordata / Aves | Pluvialis fulva | [ ] | [x] | [ ] | [ ] | [ ] | [x] | [ ] | [ ] |  |  |  | LC | [ ] | [ ] |  | Important site during life-cycle of migratory species. |
| Chordata / Aves | Sterna striata | [ ] | [ ] | [ ] | [ ] | [ ] | [x] | [ ] | [ ] |  |  |  | LC | [ ] | [ ] | At Risk (Declining) |  |
|  |  | [ ] | [ ] | [ ] | [ ] | [ ] | [ ] | [ ] | [ ] |  |  |  |  | [ ] | [ ] |  |  |

GBIF Secretariat (2019). GBIF Backbone Taxonomy. Checklist dataset https://doi.org/10.15468/39omei accessed via GBIF.org on 2020-07-15.

Optional text box to provide further information on animal species of international importance:

(This field is limited to 3000 characters)

|  |  |
| --- | --- |
|  | The Firth of Thames is a terminal point for the East Asian-Australasian flyway, and one of the three most important coastal stretches for wading birds in New Zealand, supporting over 20,000 birds per year, most of which are migratory. The site is the most important wintering site nationally for pied stilts (Himantopus himantopus) and sharp-tailed sandpipers (Calidris acuminata), the second most important wintering site for wrybills (Anarhynchus frontalis) and whimbrels (Numenius phaeopus), and the third most important wintering site for pied oystercatchers (Haematopus finschi). The Firth holds more than 1% of the northern New Zealand dotterel (Charadrius obscurus) population in winter and is one of the top 10 sites for wintering black stilts (Himantopus novaezelandiae) and dark hybrid stilts. Up to three black stilts have been recorded annually at the site during most years since 2004. In 2017 the total population of this species was estimated at 106 birds, therefore the site regularly supports up to 3% of the bioregional population of this species each winter.    Other species recorded: Royal spoonbill (Platalea regia), cattle egret (Bubulcus ibis), lesser sand plover/Mongolian dotterel (Charadrius mongolus), pectoral sandpiper (Calidris melanotos), great knot (Calidris tenuirostris), grey plover (Pluvialis squatarola), Hudsonian godwit (Limosa haemastica), black-tailed godwit (Limosa limosa), little whimbrel/little curlew (Numenius minutus), grey-tailed (Siberian) tattler (Tringa brevipes), semipalmated plover (Charadrius semipalmatus), ruff (Charadrius pugnax), Terek sandpiper (Xenus cinereus), Arctic skua (Stercorarius parasiticus), Pomarine skua (Coprotheres pomarinus), gull-billed tern (Gelochelidon nilotica), and little tern (Sternula albifrons).    Threatened species status (other status) for qualification under Criterion 2 is based on the New Zealand Threat Classification System administered by the NZ Department of Conservation. This classification system defines the Threatened (Nationally Critical, Nationally Endangered and Nationally Vulnerable) species in New Zealand that qualify under Criterion 2. The classification system also defines the At Risk (Declining, Naturally Uncommon, Relict) species that are near-threatened. For details on the classification system refer to: Townsend et al  (2008): New Zealand Threat Classification System Manual. Department of Conservation, Wellington. 35 p |

3.4 Ecological communities whose presence relates to the international importance of the site

|  |  |  |  |
| --- | --- | --- | --- |
| **Name of ecological community** | **Community qualifies under Criterion 2?** | **Description** | **Justification** |
| Mangrove forest | [ ] | New Zealand's sole mangrove species (Avicennia marina ssp. australasica) forms a continuous canopy over a small number of other vascular plants including glasswort (Sarcocornia quinquefolia) and seagrass (Zostera muelleri subsp. novazelandica). | Representative. One of the largest contiguous areas of open coast mangrove forest in New Zealand. |
| Chenier plain | [ ] | Recent shell banks form spits into the intertidal zone on the western Firth of Thames. They are sparsely vegetated with predominantly exotic herbs and sedges. | Naturally uncommon and critically threatened ecosystem |
|  | [ ] |  |  |

Optional text box to provide further information (This field is limited to 4000 characters)

|  |  |
| --- | --- |
|  | This chenier is probably the best example globally of a Holocene coastal strand plain accreted by a combination of gravel and shell that overlie intertidal mud. It is the most extensive chenier plain system in New Zealand, and is the only known example, globally, of a chenier plain that is currently aggrading (at a rate of 50 m southwards per year). The ridges formed over the past 4500 years and extend along most of the western side of the Firth of Thames.    North of Kaiaua township the ridges are formed by small boulders, while south of the town they are comprised predominantly of shell (mainly cockle, Austrovenus stutchburyi). The gravel portion occurs in the north around Whakatiwai and is fed by greywacke pebbles eroded from the Hunua Ranges. These pebbles are moved southwards during coastal storms and become more rounded, smaller and less common towards the south, where they are replaced by vast masses of shells, dominantly cockle.    The southern two thirds of the chenier plain was created by the accretion of a sequence of shell cheniers over the last 4000 yrs. Most of the chenier plain lies outside of the Ramsar boundary, being above intertidal areas, but a relatively new shell ridge (<50 years) is accreting within the site. A strip of land seaward of the road from the Pūkorokoro Miranda Shorebird Centre and southward is a complex of young shell cheniers and their feathery washover lobes separated by lower elevation areas of accumulated salt marsh mud. Nearer the coast these low areas support salt marsh and salt meadow communities that are periodically inundated by spring high tides. Closer to the road some of these elongate depressions become shallow ponds after heavy rain and exceptionally high tides. Sea level is currently rising faster than it has at any time in the last 5000 years and is already causing erosion of the shore to the north around Kaiaua. This may affect the chenier accretion, however the supply of sand and shell to the southern end of the plain is currently outstripping the erosive effects of sea level rise. |

What is the Site like?

4.1 Ecological character

Please summarize the ecological components, processes and services which are critical to determining the ecological character of the site. Please also summarize any natural variability in the ecological character of the site, and any known past or current change

(This field is limited to 4000 characters)

|  |  |
| --- | --- |
|  | The Ramsar site occupies the southern section of the Firth of Thames, a shallow marine embayment (semi-enclosed bay), and includes most of its approximately 8220 hectares of exposed intertidal feeding grounds and shellbanks. The site comprises three intertidal habitats – shallow estuarine water and intertidal mudflats (c.6600 ha), shellbanks (117 ha), and mangrove forest and salt marsh (c.1500 ha).    Mangroves (Avicennia marina subsp. australasica), form a 20 kilometre band (up to 900 m wide) of monospecific intertidal forest around the coastline. Further shoreward, reached only by spring tides, are salt marshes of Sarcocornia quinqueflora, Cotula coronopifolia, the naturally uncommon Maori musk (Thyridia repens), and saltmarsh ribbonwood (Plagianthus divaricatus). Narrow sea meadows with native herbs Samolus repens and Selliera radicans are flooded only by very high tides. A high proportion of exotic species colonise better drained sites.    The site offers an abundance of desirable food, mainly intertidal shellfish and worms, along with safe high-water coastal roosts, which attracts thousands of migratory wading birds. A total of 132 bird species have been recorded here comprising endemic species, native species and overseas migrants, including 9,000-10,000 Arctic breeders that forage in the productive intertidal areas each southern summer. Since 2004, an average of approximately 25,700 waders (summer and winter counts combined) from 27 species have been counted in the Ramsar site. The most abundant have been pied oystercatchers (almost 10,000 annually on average), bar-tailed godwits (6000), red knots (3000), pied stilts (3600), and wrybills (2000). The highest annual count since 2004 was 35,000 birds, comprising some 20,000 waders in winter (mostly national migrants including pied oystercatchers, pied stilts and wrybills), and up to 15,000 in summer (mostly international migrants including bar-tailed godwits and red knots).    The Firth is of international importance for the presence of the active Miranda chenier plain.    Birdwatching and tourism are important ecosystem services provided at the site, but it also provides an important fishery of local significance, with flounder and snapper the main species caught.    The Firth is now mesotrophic. Inputs from the land are the dominant source of nutrients, with predicted nitrogen loads from the Hauraki Plains among the highest in New Zealand. The site is sensitive to nutrient enrichment, although some symptoms of eutrophication may be suppressed by physical factors such as turbid water/low light, short water residence time, and strong vertical mixing of the water column. Denitrification is likely to be an important ecosystem service in the Firth that reduces the risk of eutrophication.    Approximately 430,000 t/yr of sediment is deposited on the mudflats in the southern Firth. This sediment load is substantially higher that what occurred naturally, prior to human-induced land use change. Present-day inputs from the catchment (mainly from river bank erosion) account for ~40% of the sediments deposited. Re-suspension of legacy sediments, washed into the Firth during the large-scale deforestation in the late 19th and early 20th century, accounts for the remainder of sediment input. Mangroves have colonised the rapidly accreting intertidal flats since the early 1960s, however further expansion is limited by sea-level rise and mudflat subsidence.    The inputs of sediment and nutrients into the Firth have contributed to an increasingly muddy seabed, a loss of water clarity, seasonal low dissolved oxygen levels near the seabed and a decrease in pH. The current macrobenthic community (which replaced a former hard biogenic reef destroyed by dredging in the 1960s) is adapted to the muddier conditions and likely to be resilient to ongoing deposition of fine sediment. |

4.2 What wetland type(s) are in the site?

Please list all wetland types which occur on the site, and for each of them: - rank the four most abundant types by area from 1 (greatest extent) to 4 (least extent) in the third column, - if the information exists, provide the area (in ha) in the fourth column - if this wetland type is used for justifying the application of Criterion 1, indicate if it is representative, rare or unique in the last column - you can give the local name of the wetland type if different from the Ramsar classification system in the second column

Marine or coastal wetlands

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Wetland types (code and name)**[[7]](#footnote-7) | **Local name** | **Ranking of extent (1: greatest - 4: least)** | **Area (ha) of wetland type** | **Justification of Criterion 1**[[8]](#footnote-8) |
| A: Permanent shallow marine waters |  |  |  |  |
| E: Sand, shingle or pebble shores |  | 4 |  | Representative |
| F: Estuarine waters |  | 0 |  |  |
| G: Intertidal mud, sand or salt flats |  | 1 |  |  |
| H: Intertidal marshes |  | 3 |  |  |
| I: Intertidal forested wetlands |  | 2 |  | Representative |
| J: Coastal brackish / saline lagoons |  | 0 |  |  |
|  |  |  |  |  |

Inland wetlands

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Wetland types (code and name)**[[9]](#footnote-9) | **Local name** | **Ranking of extent (1: greatest - 4: least)** | **Area (ha) of wetland type** | **Justification of Criterion 1**8 |
|  |  |  |  |  |

Human-made wetlands

|  |  |  |  |
| --- | --- | --- | --- |
| **Wetland types (code and name)**[[10]](#footnote-10) | **Local name** | **Ranking of extent (1: greatest - 4: least)** | **Area (ha) of wetland type** |
| 2: Ponds |  | 0 |  |
| 9: Canals and drainage channels or ditches |  | 0 |  |
|  |  |  |  |

What non-wetland habitats are within the site?

Other non-wetland habitat

|  |  |
| --- | --- |
| **Other non-wetland habitats within the site** | **Area (ha) if known** |
| Pasture grass |  |
|  |  |

Habitat connectivity (ECD)

|  |  |
| --- | --- |
|  |  |

4.3 Biological components

4.3.1 Plant species

GBIF Secretariat (2019). GBIF Backbone Taxonomy. Checklist dataset https://doi.org/10.15468/39omei accessed via GBIF.org on 2020-07-15.

Other noteworthy plant species

|  |  |  |
| --- | --- | --- |
| **Phylum** | **Scientific name** | **Position in range / endemism / other** (optional) |
| Tracheophyta / Magnoliopsida | Ileostylus micranthus | Regionally uncommon. Present in a narrow strip of saltmarsh shrubland on the seaward side of East Coast Road just north of shorebird centre. |
| Tracheophyta / Magnoliopsida | Samolus repens | Moth habitat/host |
| Tracheophyta / Magnoliopsida | Thyridia repens | At risk – naturally uncommon |
| Tracheophyta / Liliopsida | Zostera novazelandica | Seagrass. Keystone species |
|  |  |  |

Invasive alien plant species

|  |  |  |  |
| --- | --- | --- | --- |
| **Phylum** | **Scientific name** | **Impacts**[[11]](#footnote-11) | **Changes at RIS update**[[12]](#footnote-12) |
| Tracheophyta / Liliopsida | Carex divisa | Actual (major impacts) | increase |
| Tracheophyta / Magnoliopsida | Carpobrotus edulis | Actual (minor impacts) | No change |
| Tracheophyta / Liliopsida | Cortaderia jubata | Actual (minor impacts) | No change |
| Tracheophyta / Liliopsida | Cortaderia selloana | Actual (minor impacts) | No change |
| Tracheophyta / Liliopsida | Festuca arundinacea | Actual (minor impacts) | No change |
| Tracheophyta / Magnoliopsida | Foeniculum vulgare | Actual (minor impacts) | increase |
| Tracheophyta / Liliopsida | Paspalum vaginatum | Actual (minor impacts) | increase |
| Tracheophyta / Magnoliopsida | Plantago lanceolata | Actual (minor impacts) | No change |
| Tracheophyta / Liliopsida | Spartina alterniflora | Actual (minor impacts) | decrease |
|  |  |  |  |

GBIF Secretariat (2019). GBIF Backbone Taxonomy. Checklist dataset https://doi.org/10.15468/39omei accessed via GBIF.org on 2020-07-15.

Optional text box to provide further information (This field is limited to 2500 characters)

|  |  |
| --- | --- |
|  | Some of these invasive species are landward species, above high water mark, including pampas, tall fescue and wild fennel. Others are salt-tolerant and pose a risk to the natural character of the intertidal zones, including Spartina and Mercer grass. |

4.3.2 Animal species

Other noteworthy animal species

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Phylum** | **Scientific name** | **Pop. size** (optional) | **Period of pop. est.** (optional) | **% occurrence** (optional) | **Position in range /endemism/other** (optional) |
| Chordata / Actinopterygii | Anguilla australis |  |  |  | Indigenous fishery species |
| Chordata / Reptilia | Oligosoma smithi |  |  |  | Uncommon species |
| Chordata / Aves | Platalea regia |  |  |  | Naturally uncommon |
| Chordata / Actinopterygii | Rhombosolea leporina |  |  |  | Indigenous fishery species |
|  |  |  |  |  |  |

GBIF Secretariat (2019). GBIF Backbone Taxonomy. Checklist dataset https://doi.org/10.15468/39omei accessed via GBIF.org on 2020-07-15.

Invasive alien animal species

|  |  |  |  |
| --- | --- | --- | --- |
| **Phylum** | **Scientific name** | **Impacts** | **Changes at RIS update**11 |
| Mollusca / Bivalvia | Arcuatula senhousia | Actual (minor impacts) | unknown |
| Mollusca / Bivalvia | Crassostrea sikamea | Actual (minor impacts) | unknown |
| Chordata / Mammalia | Erinaceus europaeus | Actual (major impacts) | No change |
| Chordata / Mammalia | Felis catus | Actual (major impacts) | No change |
| Chordata / Mammalia | Lepus europaeus | Actual (minor impacts) | No change |
| Arthropoda / Malacostraca | Metapenaeus bennettae | Potential | No change |
| Chordata / Mammalia | Mustela erminea | Actual (major impacts) | No change |
| Chordata / Mammalia | Mustela nivalis vulgaris | Actual (major impacts) | No change |
| Chordata / Mammalia | Mustela putorius furo | Actual (minor impacts) | No change |
| Chordata / Actinopterygii | Omobranchus anolius | Actual (minor impacts) | unknown |
| Chordata / Mammalia | Oryctolagus cuniculus | Actual (minor impacts) | No change |
| Arthropoda / Insecta | Polistes dominula | Actual (minor impacts) | increase |
| Annelida / Polychaeta | Polydora haswelli | Actual (minor impacts) | unknown |
| Annelida / Polychaeta | Polydora websteri | Actual (minor impacts) | unknown |
| Chordata / Mammalia | Rattus norvegicus | Actual (minor impacts) | No change |
| Chordata / Mammalia | Rattus rattus | Actual (major impacts) | No change |
|  |  |  |  |

GBIF Secretariat (2019). GBIF Backbone Taxonomy. Checklist dataset https://doi.org/10.15468/39omei accessed via GBIF.org on 2020-07-15.

Optional text box to provide further information (This field is limited to 2500 characters)

|  |  |
| --- | --- |
|  |  |

4.4 Physical components

4.4.1 Climate

Please indicate the prevailing climate type(s) by selecting below the climatic region(s) and subregion(s), using the Köppen-Gieger Climate Classification System.

|  |  |
| --- | --- |
| **Climatic region**[[13]](#footnote-13) | **Subregion**[[14]](#footnote-14) |
| C: Moist Mid-Latitude climate with mild winters | Cfb: Marine west coast (Mild with no dry season, warm summer) |
|  |  |

If changing climatic conditions are affecting the site, please indicate the nature of these changes:

(This field is limited to 1000 characters)

|  |  |
| --- | --- |
|  | The average annual rainfall is approx 1200 mm with a mean annual temperature of about 14°C. |

4.4.2 Geomorphic setting

a) Minimum elevation above sea level (in metres) (The online RIS only accepts numeric values)

|  |  |
| --- | --- |
|  | -1 |

a) Maximum elevation above sea level (in metres) (The online RIS only accepts numeric values)

|  |  |
| --- | --- |
|  | 3 |

b) Position in landscape/river basin:

[ ] Entire river basin

[ ] Upper part of river basin

[ ] Middle part of river basin

[x] Lower part of river basin

[x] More than one river basin

[ ] Not in river basin

[x] Coastal

Please name the river basin or basins. If the site lies in a sub-basin, please also name the larger river basin. For a coastal/marine site, please name the sea or ocean. (This field is limited to 1000 characters)

|  |  |
| --- | --- |
|  | Hauraki Gulf, Pacific Ocean, basin of Waihou, Piako and Waitakaruru Rivers |

4.4.3 Soil

[x] Mineral

Changes at RIS update (Update)

[x] No change / [ ] Increase / [ ] Decrease / [ ] Unknown

.

.

.

[x] Organic

Changes at RIS update (Update)

[x] No change / [ ] Increase / [ ] Decrease / [ ] Unknown

.

.

.

[ ] No available information

Are soil types subject to change as a result of changing hydrological conditions (e.g., increased salinity or acidification)?

[ ] Yes / [x] No

.

Please provide further information on the soil (optional) (This field is limited to 1000 characters)

|  |  |
| --- | --- |
|  | The soil is salty and often waterlogged. The sea floor of the Firth consists of fine clay, silt and sand sediments laid over pumice sands and the maximum depth of the intertidal areas is 2.2 m at mean high water spring.    Soil types are dynamic, subject to changes in re-suspended legacy sediments and river loads. There continues to be a relatively high deposition of mineral soils in the site, but the rate of deposition has not changed since the previous update. |

4.4.4 Water regime

Water permanence

|  |  |
| --- | --- |
| **Presence?**[[15]](#footnote-15) | **Changes at RIS update**12 |
| Usually permanent water present | No change |
|  |  |

Source of water that maintains character of the site

|  |  |  |
| --- | --- | --- |
| **Presence?**[[16]](#footnote-16) | **Predominant water source** | **Changes at RIS update**12 |
| Water inputs from surface water | [x] | No change |
| Marine water | [x] | No change |
|  | [ ] |  |

Water destination

|  |  |
| --- | --- |
| **Presence?**[[17]](#footnote-17) | **Changes at RIS update**12 |
| Marine | No change |
|  |  |

Stability of water regime

|  |  |
| --- | --- |
| **Presence?**[[18]](#footnote-18) | **Changes at RIS update**12 |
| Water levels fluctuating (including tidal) | No change |
|  |  |

Please add any comments on the water regime and its determinants (if relevant). Use this box to explain sites with complex hydrology: (This field is limited to 2000 characters)

|  |  |
| --- | --- |
|  | The Firth of Thames is a drowned valley that lies in the northern part of the Hauraki graben, bounded by fault lines along the Hunua and Coromandel ranges.    The Waikato River originally flowed through the Hauraki graben and emptied into the Firth bringing with it much of the fertile alluvium of the region. Today the Waihou, Piako and Waitakaruru Rivers flow into the Firth from the south and together with the strong northwest wave action, determine the biological character and natural resource. Tidal and wind-driven currents, mixing, and stratification are important hydrodynamic processes that influence all biogeochemical processes in the Firth of Thames and the wider Hauraki Gulf.    The catchment area of the Firth is 3600 square kilometres with three billion cubic metres of water entering the Firth of Thames from the Waihou and Piako Rivers every year. |

Connectivity of surface waters and of groundwater (ECD)

|  |  |
| --- | --- |
|  |  |

Stratification and mixing regime (ECD)

|  |  |
| --- | --- |
|  |  |

4.4.5 Sediment regime

[ ] Significant erosion of sediments occurs on the site

Changes at RIS update (Update)

[x] No change / [ ] Increase / [ ] Decrease / [ ] Unknown

.

.

.

[x] Significant accretion or deposition of sediments occurs on the site

Changes at RIS update (Update)

[x] No change / [ ] Increase / [ ] Decrease / [ ] Unknown

.

.

.

[ ] Significant transportation of sediments occurs on or through the site

Changes at RIS update (Update)

[x] No change / [ ] Increase / [ ] Decrease / [ ] Unknown

.

.

.

[ ] Sediment regime is highly variable, either seasonally or inter-annually

Changes at RIS update (Update)

[x] No change / [ ] Increase / [ ] Decrease / [ ] Unknown

.

.

.

[ ] Sediment regime unknown

Please provide further information on sediment (optional): (This field is limited to 1000 characters)

|  |  |
| --- | --- |
|  | Large scale land conversion has increased sediment accumulation rates up to ten times higher than 90 years ago. An estimated 430,000 metric tonnes per year is currently deposited in the southern Firth (Green & Zeldis 2015). The sediment deposition rate has not changed since the previous RIS update, although this is a significant threatening process given the deposition is occurring at a much higher rate than occurred prior to land use change.    As of 2012, 40% of the accumulated sediment was derived from sub-soil delivered by the Waihou and Piako Rivers. The balance is thought to be sourced from the reworking of legacy sediments deposited in the Firth during large-scale deforestation activities a century ago. The proportion of these legacy ‘estuarine’ sediments has increased over time, likely progressively transported onshore through wind, wave and current action. |

Water turbidity and colour (ECD)

|  |  |
| --- | --- |
|  |  |

Light - reaching wetland (ECD)

|  |  |
| --- | --- |
|  |  |

Water temperature (ECD)

|  |  |
| --- | --- |
|  |  |

4.4.6 Water pH

[ ] Acid (pH<5.5)

Changes at RIS update (Update)

[x] No change / [ ] Increase / [ ] Decrease / [ ] Unknown

.

.

.

[ ] Circumneutral (pH: 5.5-7.4 )

Changes at RIS update (Update)

[x] No change / [ ] Increase / [ ] Decrease / [ ] Unknown

.

.

.

[ ] Alkaline (pH>7.4)

Changes at RIS update (Update)

[x] No change / [ ] Increase / [ ] Decrease / [ ] Unknown

.

.

.

[x] Unknown

Please provide further information on pH (optional): (This field is limited to 1000 characters)

|  |  |
| --- | --- |
|  |  |

4.4.7 Water salinity

[ ] Fresh (<0.5 g/l)

Changes at RIS update (Update)

[ ] No change / [ ] Increase / [ ] Decrease / [x] Unknown

.

.

.

[ ] Mixohaline (brackish)/Mixosaline (0.5-30 g/l)

Changes at RIS update (Update)

[ ] No change / [ ] Increase / [ ] Decrease / [x] Unknown

.

.

.

[ ] Euhaline/Eusaline (30-40 g/l)

Changes at RIS update (Update)

[ ] No change / [ ] Increase / [ ] Decrease / [x] Unknown

.

.

.

[ ] Hyperhaline/Hypersaline (>40 g/l)

Changes at RIS update (Update)

[ ] No change / [ ] Increase / [ ] Decrease / [x] Unknown

.

.

.

[x] Unknown

Please provide further information on salinity (optional): (This field is limited to 1000 characters)

|  |  |
| --- | --- |
|  | Continuous monitoring of the water column at 5m below surface in the inner Firth from January-April (southern hemisphere summer to autumn) in 2013 showed salinity ranging from 34.5-35 psu. These data are collected from an area of the inner Firth beyond the Ramsar site boundary and may not reflect salinity values within the Ramsar site. |

Dissolved gases in water (ECD)

|  |  |
| --- | --- |
|  |  |

4.4.8 Dissolved or suspended nutrients in water

[ ] Eutrophic

Changes at RIS update (Update)

[x] No change / [ ] Increase / [ ] Decrease / [ ] Unknown

.

.

.

[x] Mesotrophic

Changes at RIS update (Update)

[ ] No change / [ ] Increase / [x] Decrease / [ ] Unknown

.

.

.

[ ] Oligotrophic

Changes at RIS update (Update)

[x] No change / [ ] Increase / [ ] Decrease / [ ] Unknown

.

.

.

[ ] Dystrophic

Changes at RIS update (Update)

[x] No change / [ ] Increase / [ ] Decrease / [ ] Unknown

.

.

.

[ ] Unknown

Please provide further information on dissolved or suspended nutrients (optional): (This field is limited to 1000 characters)

|  |  |
| --- | --- |
|  | Predicted nitrogen loads from the Hauraki Plains are among the highest in New Zealand. Inputs from the land are the dominant source. Between 2006 and 2015, the major rivers draining to the southern Firth of Thames were estimated to have carried an average annual load of 3,716 tonnes of nitrogen and 256 tonnes of phosphorus. During 2006–2015 the combined load of nitrogen and phosphorus carried by the Hauraki rivers decreased at a rate of about 1.2 % and 3.1% per year respectively. These improvements are at a higher rate than over the past 25 years (1991-2015) which experienced average decreases of 0.3% and 2% respectively for Total N and Total P. Diffuse agricultural sources contribute an estimated 73% of the nitrogen load and 41% of the phosphorus load. The monitoring sites are well upstream of the river mouths and may not represent the state of water entering the Firth.    Dairy cow numbers and stocking rates in the catchment have remained steady at 3 cows/per effective ha since 2007. |

Dissolved organic carbon (ECD)

|  |  |
| --- | --- |
|  |  |

Redox potential of water and sediments (ECD)

|  |  |
| --- | --- |
|  |  |

Water conductivity (ECD)

|  |  |
| --- | --- |
|  |  |

4.4.9 Features of the surrounding area which may affect the Site

Please describe whether, and if so how, the landscape and ecological characteristics in the area surrounding the Ramsar Site differ from the site itself:

[ ] i) broadly similar / [x] ii) significantly different

.

If the surrounding area differs from the Ramsar Site, please indicate how: (Please tick all categories that apply)

[x] Surrounding area has greater urbanisation or development

[x] Surrounding area has higher human population density

[x] Surrounding area has more intensive agricultural use

[x] Surrounding area has significantly different land cover or habitat types

Please describe other ways in which the surrounding area is different: (This field is limited to 2000 characters)

|  |  |
| --- | --- |
|  | The surrounding terrestrial areas are primarily in pasture and farmed while the waters of the Firth of Thames are used for fishing and boating. In the past, much of the surrounding land has been cleared of indigenous vegetation and drained for agriculture resulting in sediment deposition and loss of some habitat in the Firth. |

4.5 Ecosystem services

4.5.1 Ecosystem services/benefits

Please select below all relevant ecosystem services/benefits currently provided by the site and indicate their relative importance in the right-hand column.

Provisioning Services

|  |  |  |
| --- | --- | --- |
| **Ecosystem service**[[19]](#footnote-19) | **Examples**[[20]](#footnote-20) | **Importance/Extent/Significance**[[21]](#footnote-21) |
| Food for humans | Sustenance for humans (e.g., fish, molluscs, grains) | Medium |
|  |  |  |

Regulating Services

|  |  |  |
| --- | --- | --- |
| **Ecosystem service**[[22]](#footnote-22) | **Examples**[[23]](#footnote-23) | **Importance/Extent/Significance**21 |
| Erosion protection | Soil, sediment and nutrient retention | Medium |
| Pollution control and detoxification | Water purification/waste treatment or dilution | Medium |
| Climate regulation | Local climate regulation/buffering of change | Medium |
| Hazard reduction | Coastal shoreline and river bank stabilization and storm protection | High |
|  |  |  |

Cultural Services

|  |  |  |
| --- | --- | --- |
| **Ecosystem service**[[24]](#footnote-24) | **Examples**[[25]](#footnote-25) | **Importance/Extent/Significance**21 |
| Recreation and tourism | Recreational hunting and fishing | High |
| Recreation and tourism | Nature observation and nature-based tourism | High |
| Spiritual and inspirational | Cultural heritage (historical and archaeological) | Medium |
| Scientific and educational | Important knowledge systems, importance for research (scientific reference area or site) | High |
| Scientific and educational | Educational activities and opportunities | High |
| Scientific and educational | Long-term monitoring site | High |
| Scientific and educational | Major scientific study site | High |
|  |  |  |

Supporting Services

|  |  |  |
| --- | --- | --- |
| **Ecosystem service**[[26]](#footnote-26) | **Examples**[[27]](#footnote-27) | **Importance/Extent/Significance**21 |
| Biodiversity | Supports a variety of all life forms including plants, animals and microorganizms, the genes they contain, and the ecosystems of which they form a part | High |
| Soil formation | Sediment retention | High |
| Soil formation | Accumulation of organic matter | High |
| Nutrient cycling | Storage, recycling, processing and acquisition of nutrients | High |
| Nutrient cycling | Carbon storage/sequestration | High |
|  |  |  |

Optional text box to provide further information (This field is limited to 2500 characters)

|  |  |
| --- | --- |
|  |  |

Other ecosystem service(s) not included above: (This field is limited to 2000 characters)

|  |  |
| --- | --- |
|  | Biofilm, phytoplankton, important food source for some shorebirds |

Please make a rough estimate of the approximate number of people (distinguish between residents and visitors if possible) who directly benefit from the ecological services provided by this site (estimate at least in orders of magnitude: 10s, 100s, 1000s, 10 000s etc.):

Within the site:

|  |  |
| --- | --- |
|  | 20,000 |

Outside the site:

|  |  |
| --- | --- |
|  | 50,000 |

Have studies or assessments been made of the economic valuation of ecosystem services provided by this Ramsar Site?

[ ] Yes / [x] No / [ ] Unknown

.

.

Where economic studies or assessments of economic valuation have been undertaken at the site, it would be helpful to provide information on where the results of such studies may be located (e.g. website links, citation of published literature): (This field is limited to 2500 characters)

|  |  |
| --- | --- |
|  |  |

4.5.2 Social and cultural values

Is the site considered internationally important for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning? If so, please describe this importance under one or more of the four following categories. You should not list here any values derived from non-sustainable exploitation or which result in detrimental ecological changes.

[ ] i) the site provides a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland

Description if applicable (This field is limited to 2500 characters)

|  |  |
| --- | --- |
|  |  |

[ ] ii) the site has exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland

Description if applicable (This field is limited to 2500 characters)

|  |  |
| --- | --- |
|  |  |

[ ] iii) the ecological character of the wetland depends on its interaction with local communities or indigenous peoples

Description if applicable (This field is limited to 2500 characters)

|  |  |
| --- | --- |
|  |  |

[ ] iv) relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland

Description if applicable (This field is limited to 2500 characters)

|  |  |
| --- | --- |
|  |  |

4.6 Ecological processes

This section is not intended for completion as part of a standard RIS, but is included for completeness as part of the agreed format of a ‘full’ Ecological Character Description (ECD) outlined by Resolution X.15

Primary production (ECD)

|  |  |
| --- | --- |
|  |  |

Nutrient cycling (ECD)

|  |  |
| --- | --- |
|  |  |

Carbon cycling (ECD)

|  |  |
| --- | --- |
|  |  |

Animal reproductive productivity (ECD)

|  |  |
| --- | --- |
|  |  |

Vegetational productivity, pollination, regeneration processes, succession, role of fire, etc. (ECD)

|  |  |
| --- | --- |
|  |  |

Notable species interactions, including grazing, predation, competition, diseases and pathogens (ECD)

|  |  |
| --- | --- |
|  |  |

Notable aspects concerning animal and plant dispersal (ECD)

|  |  |
| --- | --- |
|  |  |

Notable aspects concerning migration (ECD)

|  |  |
| --- | --- |
|  |  |

Pressures and trends concerning any of the above, and/or concerning ecosystem integrity (ECD)

|  |  |
| --- | --- |
|  |  |

How is the Site managed?

5.1 Land tenure and responsibilities (Managers)

5.1.1 Land tenure/ownership

Please specify if this category applies to the Ramsar Site, to the surrounding area or to both, by ticking the relevant option(s).

Public ownership

|  |  |  |
| --- | --- | --- |
| **Category**[[28]](#footnote-28) | **Within the Ramsar Site** | **In the surrounding area** |
| National/Federal government | [x] | [x] |
| Provincial/region/state government | [x] | [x] |
| Local authority, municipality, (sub)district, etc. | [x] | [x] |
|  | [ ] | [ ] |

Private ownership

|  |  |  |
| --- | --- | --- |
| **Category**[[29]](#footnote-29) | **Within the Ramsar Site** | **In the surrounding area** |
| Other types of private/individual owner(s) | [x] | [x] |
|  | [ ] | [ ] |

Other

|  |  |  |
| --- | --- | --- |
| **Category**[[30]](#footnote-30) | **Within the Ramsar Site** | **In the surrounding area** |
|  | [ ] | [ ] |

Provide further information on the land tenure / ownership regime (optional): (This field is limited to 1000 characters)

|  |  |
| --- | --- |
|  | (a) within the Ramsar site: The intertidal flats that are not contained within a designated reserve are deemed common marine and coastal area under the Marine and Coastal Area (Takutai Moana) Act 2011 and have no special protection status. A coastal reserve (Taramaire) of about 30 hectares is managed by the Department of Conservation and flanked by approximately 1.7 km of coastline north of Pukorokoro Miranda.    (b) in the surrounding area: The majority of land adjoining the site is in private ownership. An area of 27.7 ha is covenanted under the Queen Elizabeth II National trust and is managed and owned by the Pukorokoro Miranda Naturalists Trust. |

5.1.2 Management authority

Please list the local office / offices of any agency or organization responsible for managing the site: (This field is limited to 1000 characters)

|  |  |
| --- | --- |
|  | Department of Conservation |

Provide the name and/or title of the person or people with responsibility for the wetland:

|  |  |
| --- | --- |
|  | Operations Manager, Hauraki Area Office |

Postal address: (This field is limited to 1000 characters)

|  |  |
| --- | --- |
|  | PO Box 343, Thames 3540  New Zealand |

E-mail address: (The online RIS only accepts valid e-mail addresses, e.g. example@mail.com )

|  |  |
| --- | --- |
|  | thames@doc.govt.nz |

5.2 Ecological character threats and responses (Management)

5.2.1 Factors (actual or likely) adversely affecting the Site’s ecological character

Please specify if this category applies to the Ramsar Site, to the surrounding area or to both, by ticking the relevant option(s).

Human settlements (non agricultural)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Factors adversely affecting site**[[31]](#footnote-31) | **Actual threat**[[32]](#footnote-32) | **Potential threat**32 | **Within the site** | **Changes**12 | **In the surrounding area** | **Changes**12 |
| Commercial and industrial areas | Low impact |  | [ ] | No change | [x] | No change |
| Housing and urban areas | Low impact |  | [ ] | No change | [x] | No change |
| Tourism and recreation areas | Low impact |  | [x] | No change | [x] | No change |
|  |  |  | [ ] |  | [ ] |  |

Water regulation

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Factors adversely affecting site**[[33]](#footnote-33) | **Actual threat**32 | **Potential threat**32 | **Within the site** | **Changes**12 | **In the surrounding area** | **Changes**12 |
| Dredging | Low impact |  | [x] | No change | [x] | No change |
| Water abstraction | Low impact |  | [x] | unknown | [ ] | No change |
| Canalisation and river regulation | High impact |  | [ ] | No change | [x] | No change |
|  |  |  | [ ] |  | [ ] |  |

Agriculture and aquaculture

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Factors adversely affecting site**[[34]](#footnote-34) | **Actual threat**32 | **Potential threat**32 | **Within the site** | **Changes**12 | **In the surrounding area** | **Changes**12 |
| Livestock farming and ranching | High impact |  | [ ] | No change | [x] | No change |
| Marine and freshwater aquaculture | Medium impact |  | [ ] | No change | [x] | No change |
|  |  |  | [ ] |  | [ ] |  |

Energy production and mining

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Factors adversely affecting site**[[35]](#footnote-35) | **Actual threat**32 | **Potential threat**32 | **Within the site** | **Changes**12 | **In the surrounding area** | **Changes**12 |
|  |  |  | [ ] |  | [ ] |  |

Transportation and service corridors

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Factors adversely affecting site**[[36]](#footnote-36) | **Actual threat**32 | **Potential threat**32 | **Within the site** | **Changes**12 | **In the surrounding area** | **Changes**12 |
| Roads and railroads | Low impact |  | [ ] | No change | [x] | No change |
| Aircraft flight paths | Low impact |  | [x] | No change | [x] | No change |
|  |  |  | [ ] |  | [ ] |  |

Biological resource use

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Factors adversely affecting site**[[37]](#footnote-37) | **Actual threat**32 | **Potential threat**32 | **Within the site** | **Changes**12 | **In the surrounding area** | **Changes**12 |
| Fishing and harvesting aquatic resources | Medium impact |  | [x] | No change | [x] | No change |
|  |  |  | [ ] |  | [ ] |  |

Human intrusions and disturbance

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Factors adversely affecting site**[[38]](#footnote-38) | **Actual threat**32 | **Potential threat**32 | **Within the site** | **Changes**12 | **In the surrounding area** | **Changes**12 |
| Recreational and tourism activities | Medium impact |  | [x] | No change | [x] | No change |
|  |  |  | [ ] |  | [ ] |  |

Natural system modifications

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Factors adversely affecting site**[[39]](#footnote-39) | **Actual threat**32 | **Potential threat**32 | **Within the site** | **Changes**12 | **In the surrounding area** | **Changes**12 |
| Vegetation clearance/ land conversion | Low impact |  | [ ] | No change | [x] | unknown |
|  |  |  | [ ] |  | [ ] |  |

Invasive and other problematic species and genes

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Factors adversely affecting site**[[40]](#footnote-40) | **Actual threat**32 | **Potential threat**32 | **Within the site** | **Changes**12 | **In the surrounding area** | **Changes**12 |
| Invasive non-native/ alien species | High impact |  | [x] | increase | [x] | No change |
| Problematic native species | Low impact |  | [x] | increase | [ ] | No change |
|  |  |  | [ ] |  | [ ] |  |

Pollution

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Factors adversely affecting site**[[41]](#footnote-41) | **Actual threat**32 | **Potential threat**32 | **Within the site** | **Changes**12 | **In the surrounding area** | **Changes**12 |
| Agricultural and forestry effluents | High impact |  | [ ] | No change | [x] | No change |
| Household sewage, urban waste water | Medium impact |  | [ ] | No change | [x] | No change |
| Garbage and solid waste | Low impact |  | [ ] | No change | [x] | No change |
| Industrial and military effluents | Medium impact |  | [ ] | No change | [x] | No change |
|  |  |  | [ ] |  | [ ] |  |

Geological events

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Factors adversely affecting site**[[42]](#footnote-42) | **Actual threat**32 | **Potential threat**32 | **Within the site** | **Changes**12 | **In the surrounding area** | **Changes**12 |
| Earthquakes/tsunamis |  | Medium impact | [x] | No change | [x] | No change |
|  |  |  | [ ] |  | [ ] |  |

Climate change and severe weather

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Factors adversely affecting site**[[43]](#footnote-43) | **Actual threat**32 | **Potential threat**32 | **Within the site** | **Changes**12 | **In the surrounding area** | **Changes**12 |
| Habitat shifting and alteration |  | High impact | [x] | unknown | [ ] | No change |
| Storms and flooding | High impact | High impact | [x] | unknown | [x] | unknown |
| Droughts | High impact | High impact | [x] | unknown | [x] | unknown |
|  |  |  | [ ] |  | [ ] |  |

Please describe any other threats (optional): (This field is limited to 3000 characters)

|  |  |
| --- | --- |
|  | A Relative Risk Model developed for the site (Elmetri and Felsing 2007) indicated that the Ramsar site is under pressure from a number of existing sources, particularly agricultural land use. The highest contributing stressors to the area were sediments and contaminants followed by invasive species, habitat loss and nutrients. The model predicted that agricultural land use (primarily dairy farming) contributes much of the risk to the Ramsar site, followed by climate change, estuarine sediments and urban and industrial land use. The predicted relative risks from forests, shipping, accidental spills and human recreation were relatively low. In terms of habitats at risk, the most vulnerable was found to be to the tidal flats of the Ramsar site. Risks were relatively lower but important for the water column and stilt ponds. Open coastal areas and mangroves showed lower risks again, and the lowest risk was to airspace.    Vegetation assessment has identified cattle damage, including vegetation trampling, soil damage, grazing, and weed spread in areas of vegetation where fencing on farmland boundaries was absent or inadequate. Cattle trampling also threatens breeding success of ground-nesting birds.    Siltation – smothering of intertidal invertebrate populations from sedimentation derived mainly from old deposits retained in the Firth Basin, plus current inputs from pastoral farming and some plantation forestry harvesting in the Hauraki Catchment.    Nutrient enrichment (natural manures, chemical fertilizers, decomposing plant material).    Contaminants – pesticides, herbicides, fungicides, heavy metals and other toxins retained in the sediments from past and current mining, agriculture and industry in the catchment. Potential contaminants in agricultural runoff include cadmium (through the use of superphosphate fertiliser), zinc (mainly from that used for facial eczema treatment of livestock), other heavy metals, organic compounds and endocrine-disrupting chemicals such as oestrogen.    Coastal subdivision – sewage and storm water toxins and excavation-derived sediments from residential developments (mainly in the Thames-Kopu area, and small settlements along the Kaiaua coast).    Storm driven waves and floods can wash through nesting area and roosts affecting wading birds.    The progressive expansion of mangroves is thought to be reducing the area of intertidal mudflats available for shorebird feeding and also impacting on important habitats such as chenier roost sites and back swamp feeding grounds such as the stilt ponds. Conversely, the expansion of this community is creating increased habitat for some species including mud crabs, mud snails, herons, banded rail, flounder and eel.    Sedimentation is one of the drivers of mangrove expansion, but ongoing observations indicate that the subsidence of the tidal flats (caused by the consolidation of deep sediments) coupled with sea-level rise is likely to impede further seaward expansion. |

5.2.2 Legal conservation status

Please list any other relevant conservation status, at global, regional or national level and specify the boundary relationships with the Ramsar Site:

Global legal designations

|  |  |  |  |
| --- | --- | --- | --- |
| **Designation type**[[44]](#footnote-44) | **Name of area** | **Online information url** | **Overlap with Ramsar Site**[[45]](#footnote-45) |
|  |  |  |  |

Regional (international) legal designations

|  |  |  |  |
| --- | --- | --- | --- |
| **Designation type**[[46]](#footnote-46) | **Name of area** | **Online information url** | **Overlap with Ramsar Site**45 |
|  |  |  |  |

National legal designations

|  |  |  |  |
| --- | --- | --- | --- |
| **Designation type** | **Name of area** | **Online information url** | **Overlap with Ramsar Site**45 |
| Esplanade Reserve |  |  | partly |
| Government Purpose reserve | Miranda Taramaire Wildlife Management Reserve |  | partly |
| Marginal Strip | Waitakaruru River Mouth |  | partly |
| Marine Park | Hauraki Gulf |  | whole |
| QEII Open Space Covenant | Robert Findlay Reserve |  | partly |
| Recreation Reserve |  |  | partly |
| Stewardship Area | Miranda |  | partly |
| Stewardship Area | Orongo |  | partly |
|  |  |  |  |

Non-statutory designations

|  |  |  |  |
| --- | --- | --- | --- |
| **Designation type**[[47]](#footnote-47) | **Name of area** | **Online information url** | **Overlap with Ramsar Site**45 |
| Other non-statutory designation | ASCV 9: Firth of Thames (Kaiaua to Waihou River) | https://www.waikatoregion.govt.nz/Council/Policy-and-plans/Rules-and-regulation/Regional-Coastal-Plan/Regional-Coastal-Plan/APPENDIX-IV-Areas-of-Significant-Conservation-Value/ | whole |
| Other non-statutory designation | DOC Ecological Management Unit: Miranda |  | whole |
| Other non-statutory designation | East Asian-Australasian Flyway Network Site | www.eaaflyway.net/ | whole |
| Other non-statutory designation | WERI site (Wetland of Ecological and Representative Importance: Firth of Thames |  | whole |
| Other non-statutory designation |  |  |  |
|  |  |  |  |

5.2.3 IUCN protected areas categories (2008)

[ ] Ia Strict Nature Reserve

[ ] Ib Wilderness Area: protected area managed mainly for wilderness protection

[ ] II National Park: protected area managed mainly for ecosystem protection and recreation

[ ] III Natural Monument: protected area managed mainly for conservation of specific natural features

[x] IV Habitat/Species Management Area: protected area managed mainly for conservation through management intervention

[ ] V Protected Landscape/Seascape: protected area managed mainly for landscape/seascape conservation and recreation

[ ] VI Managed Resource Protected Area: protected area managed mainly for the sustainable use of natural ecosystems

5.2.4 Key conservation measures

Legal protection

|  |  |
| --- | --- |
| **Measures**[[48]](#footnote-48) | **Status**[[49]](#footnote-49) |
| Legal protection | Implemented |
|  |  |

Habitat

|  |  |
| --- | --- |
| **Measures**[[50]](#footnote-50) | **Status**49 |
| Catchment management initiatives/controls | Partially implemented |
| Improvement of water quality | Partially implemented |
| Habitat manipulation/enhancement | Partially implemented |
| Hydrology management/restoration | Partially implemented |
| Re-vegetation | Partially implemented |
| Land conversion controls | Partially implemented |
| Soil management | Partially implemented |
|  |  |

Species

|  |  |
| --- | --- |
| **Measures**[[51]](#footnote-51) | **Status**49 |
| Threatened/rare species management programmes | Partially implemented |
| Reintroductions | Proposed |
| Control of invasive alien plants | Partially implemented |
| Control of invasive alien animals | Partially implemented |
|  |  |

Human Activities

|  |  |
| --- | --- |
| **Measures**[[52]](#footnote-52) | **Status**49 |
| Management of water abstraction/takes | Implemented |
| Livestock management/exclusion (excluding fisheries) | Partially implemented |
| Regulation/management of wastes | Implemented |
| Fisheries management/regulation | Implemented |
| Harvest controls/poaching enforcement | Implemented |
| Regulation/management of recreational activities | Implemented |
| Communication, education, and participation and awareness activities | Partially implemented |
| Research | Partially implemented |
|  |  |

Other: (This field is limited to 3000 characters)

|  |  |
| --- | --- |
|  | The Hauraki Gulf Marine Park Act 2000 encompasses the Firth of Thames    A Hauraki Gulf Marine Spatial Plan (which encompasses the Ramsar Site) was published in 2016. Sea Change – Tai Timu Tai Pari was a collaborative effort between mana whenua (local indigenous people), local and central government agencies, and local communities and interest groups. It includes a number of principles, proposals and innovative measures to manage and protect the Gulf. The document is non-statutory.    Phase III of the Muddy Feet project includes an action plan focusing on the Ramsar Site. |

5.2.5 Management planning

Is there a site-specific management plan for the site?

|  |  |
| --- | --- |
|  | Yes[[53]](#footnote-53) |

Is the management plan/planning implemented?

[x] Yes / [ ] No

.

The management plan covers

|  |  |
| --- | --- |
|  | All of Ramsar Site[[54]](#footnote-54) |

Is the management plan currently subject to review and update?

[ ] Yes / [x] No

.

Has a management effectiveness assessment been undertaken for the site?

[ ] Yes / [x] No

.

Please give link to site-specific plan or other relevant management plan if this is available via the Internet or upload it in section 'Additional material': (This field is limited to 500 characters)

|  |  |
| --- | --- |
|  |  |

If the site is a formal transboundary site as indicated in section Data and location > Site location, are there shared management planning processes with another Contracting Party?

[ ] Yes / [x] No

.

Please indicate if a Ramsar centre, other educational or visitor facility, or an educational or visitor programme is associated with the site: (This field is limited to 1000 characters)

|  |  |
| --- | --- |
|  | The Pukorokoro Miranda Naturalist Trust Shorebird Centre |

URL of site-related webpage (if relevant):

|  |  |
| --- | --- |
|  | http://www.miranda-shorebird.org.nz/ |

5.2.6 Planning for restoration

Is there a site-specific restoration plan?

|  |  |
| --- | --- |
|  | No; but a plan is being prepared[[55]](#footnote-55) |

Has the plan been implemented?

[ ] Yes / [x] No

.

The restoration plan covers:

|  |  |
| --- | --- |
|  | Part of Ramsar Site[[56]](#footnote-56) |

Is the plan currently being reviewed and updated?

[ ] Yes / [x] No

.

Where the restoration is being undertaken to mitigate or respond to a threat or threats identified in this RIS, please indicate it / them: (This field is limited to 1000 characters)

|  |  |
| --- | --- |
|  |  |

Further information (This field is limited to 2500 characters)

|  |  |
| --- | --- |
|  | A risk analysis and an action plan have been developed by a consortium of agencies and community entities under the Muddy Feet project. These do not constitute a statutory document and have not been fully implemented, although many of the actions are being initiated by various government and non-government organisations. |

5.2.7 Monitoring implemented or proposed

|  |  |
| --- | --- |
| **Monitoring**[[57]](#footnote-57) | **Status**[[58]](#footnote-58) |
| Birds | Implemented |
| Plant community | Implemented |
| Soil quality | Implemented |
| Water quality | Implemented |
|  |  |

Please indicate other monitoring activities:

(This field is limited to 3000 characters)

|  |  |
| --- | --- |
|  | 1) The wildlife of the area has been monitored since the 1940’s with regular bird counts and studies undertaken by the Pukorokoro Miranda Naturalists Trust and Ornithological Society of New Zealand.    2) Regional and National Government are undertaking a long-term study of the oceanography of the Firth of Thames and how the current patterns, temperature profiles and chlorophyll productivity is influenced by the cyclic phenomena of El Nino and La Nina.    3) Work on the botany and entomology of the salt marsh and mangrove area is being undertaken by Ecoquest Education Foundation.    4) A Bioblitz was organised by the Pukorokoro Miranda Naturalists Trust on 28 February 2013. Data are still being compiled.    5) Regional and National Government are undertaking state of the environment monitoring    6) Pukorokoro Miranda Naturalists Trust is coordinating the development of a major benthic monitoring project for the Ramsar Site |

Additional material

6.1 Additional reports and documents

6.1.1 Bibliographical references

(This field is limited to 3000 characters)

|  |  |
| --- | --- |
|  | Battley, P.F.; Boyer, J.K.; Brownell, B.; Habraken, A.M.; Moore S.J. and Walsh, J.L. 2007. Population Biology and Foraging Ecology of Waders in the Firth of Thames – Update 2007. Prepared by Collaborating Seabird Coast Organisations for Auckland Regional Council. ARC Technical Publication 347. 90 pages    Brownell, B. (ed). 2004. Muddy Feet: Firth of Thames Ramsar site update 2004. EcoQuest Education Foundation Report Series No. 1. Kaiaua, New Zealand.    Brownell, B. 2007. Muddy Feet Phase II: Keep the birds coming. Gap analysis to identify mechanisms for optimum management of the risks to the Firth of Thames ramsar site. Environment Waikato. Hamilton, NZ.    Brownell, B, K. Hillock, C. Beard, P. Wishart and T. Higham. 2008. Muddy Feet Phase III. Getting stuck in. Restoration action plan and ecotourism vision document. Environment Waikato. Hamilton, NZ.    Elmetri, I and M. Felsing. 2007. Application of the Relative Risk Model (RRM) to investigate multiple risks to the Miranda Ramsar site. Environment Waikato Technical Report 2007/22. Environment Waikato. Hamilton, NZ.    Green, M., Zeldis, J. (2015) Firth of Thames water quality and ecosystem health – a synthesis. Waikato Regional Council, Hamilton. Waikato Regional Council Technical Report 2015/23.    Hauraki Gulf Forum. 2017. State of our Gulf 2017 Hauraki Gulf / Tīkapa Moana / Te Moana-nui-a-Toi. State of the Environment Report 2017. Auckland.    Hauraki Gulf Forum. 2014. State of our Gulf. Hauraki Gulf – Tikapa Moana/ Te Moananui a Toi. State of the Environment Report 2014. Auckland.    Needham, H., Singleton, N., Giles, H., Jones, H. 2014. Regional Estuary Monitoring Programme 10 year trend report: April 2001 to April 2011. Waikato Regional Council, Hamilton. Waikato Regional Council Technical Report 2014/41.    Swales, A., Bell, R.G., Ovenden, R., Hart, C., Horrocks, M., Hermanspahn, N. 2008 Mangrove-habitat expansion in the Southern Firth of Thames: Sedimentation processes and coastal-hazards mitigation. Environment Waikato Technical Report 2008/13, Environment Waikato, Hamilton.    Swales, A., Gibbs, M., Olsen, G., Ovenden, R., Costley, K., Stephens, T. 2016. Sources of eroded soils and their contribution to long-term sedimentation in the Firth of Thames. Waikato Regional Council and Dairy NZ, Hamilton. Waikato Regional Council Technical Report 2016/32    Vant, B. 2016. Water quality and sources of nitrogen and phosphorus in the Hauraki rivers, 2006-2015. Waikato Regional Council, Hamilton. Waikato Regional Council Technical Report 2016/17    Zeldis, J., Swales, A., Currie, K., Safi, K., S., N., Depree, C., Elliott, F., Pritchard, M., Gall, M., O’Callaghan, J., Pratt, D., Chiswell, S., M., P., Lohrer, D., Bentley, N. 2015. Firth of Thames water quality and ecosystem health: data report. Waikato Regional Council, Hamilton |

6.1.2 Additional reports and documents

i. taxonomic lists of plant and animal species occurring in the site (see section 4.3)

-UPLOAD via online form-

ii. a detailed Ecological Character Description (ECD) (in a national format)

-UPLOAD via online form-

iii. a description of the site in a national or regional wetland inventory

-UPLOAD via online form-

iv. relevant Article 3.2 reports

-UPLOAD via online form-

v. site management plan

-UPLOAD via online form-

vi. other published literature

-UPLOAD via online form-

Please note that any documents uploaded here will be made publicly available.

6.1.3 Photograph(s) of the Site

Please provide at least one photograph of the site:

|  |  |  |  |
| --- | --- | --- | --- |
| **File** | **Copyright holder** | **Date on which the picture was taken** | **Caption** |
| files/4738944/pictures/421-019.jpg | J Greenwood | 29-06-2010 | Waders including South Island pied oystercatcher, Firth of Thames Ramsar site) |
| files/4738944/pictures/421-018.jpg | J Greenwood | 29-06-2010 | Waders including Wrybills, Firth of Thames Ramsar site |
|  |  |  |  |

[x] I certify that I am the photographer, the valid holder of rights over the photograph(s), or an authorized representative of the organization which is the valid holder of rights over the photograph(s), and I hereby assign an irrevocable, perpetual and royalty-free right to use, reproduce, edit, display, transmit, prepare derivative works of, modify, publish, affix logos to, and otherwise make use of the submitted photograph(s) in any way, to the Ramsar Convention Secretariat, its affiliates and partners, for non-commercial purposes in conjunction with the mission of the Ramsar Convention. This use includes, but is not limited to, internal and external publication and materials, presentation on the websites of the Ramsar Convention or any affiliated body, and any and all other communication channels with copyright attributed to the holder in all published forms. The full accuracy of all data submitted rests with the submitter, or organization submitting the photograph(s). In submitting, I hereby agree to the aforementioned terms, personally or on behalf of the organization of which I am an authorized official, certifying that the Ramsar Convention Secretariat, its affiliates and partners are explicitly held harmless for any and all costs, expenses, or damages arising from use of the submitted photograph(s) and any additional information provided.

6.1.4 Designation letter and related data

Designation letter\*

-UPLOAD via online form-

Please upload a letter of designation from the Ramsar Administrative Authority. This letter must clearly state that the wetland is being designated for inclusion in the Ramsar List and specify the formal date of designation wished. The letter can be uploaded in two formats: Word document (doc); pdf Strategic Framework: 408. The RIS for a newly designated Site (or an update to the RIS for a previously designated site) must be officially transmitted to the Secretariat by the Ramsar Administrative Authority (AA) of the Contracting Party concerned, with a letter clearly stating that the wetland is being designated for inclusion in the Ramsar List and specifying the formal date of designation if wished. 413. The date of designation of a Ramsar Site is that indicated or requested by the Ramsar Administrative Authority (AA). The designation date required should be indicated in the designation letter from the AA to the Secretariat that accompanies the RIS. 414. If no designation date is indicated to the Secretariat, the Secretariat assigns the date of the designation letter from the Administrative Authority as the designation date of the site. 415. If, following the receipt and review of the RIS by the Secretariat (see below), a significant time-period elapses before any problems with the RIS content are resolved with the Administrative Authority, the Secretariat may propose that, with the agreement of the AA, the date of designation is that on which the RIS is finalised.

Transboundary Designation letter

-UPLOAD via online form-

Date of Designation

|  |  |
| --- | --- |
|  | 1990-01-29 |

Number of certificates wished (The online RIS only accepts numeric values)

|  |  |
| --- | --- |
|  | 0 |

1. No change to area | the area has increased | the area has decreased [↑](#footnote-ref-1)
2. Not evaluated | No | Uncertain | Yes -likely- | Yes -actual- [↑](#footnote-ref-2)
3. Marine Ecoregions of the World (MEOW) | Udvardy's Biogeographical Provinces | Bailey's Ecoregions | WWF Terrestrial Ecoregions | EU biogeographic regionalization | Freshwater Ecoregions of the World (FEOW) | Other scheme (provide name below) [↑](#footnote-ref-3)
4. [↑](#footnote-ref-4)
5. Percentage of the total biogeographic population at the site. These fields are only compulsory to justify criteria 6 & 9 [↑](#footnote-ref-5)
6. [↑](#footnote-ref-6)
7. A: Permanent shallow marine waters | B: Marine subtidal aquatic beds (Underwater vegetation) | C: Coral reefs | D: Rocky marine shores | E: Sand, shingle or pebble shores | G: Intertidal mud, sand or salt flats | Ga: Bivalve (shell-fish) reefs | H: Intertidal marshes | I: Intertidal forested wetlands | J: Coastal brackish / saline lagoons | F: Estuarine waters | Zk(a): Karst and other subterranean hydrological systems | K: Coastal freshwater lagoons [↑](#footnote-ref-7)
8. | Representative | Rare | Unique [↑](#footnote-ref-8)
9. M: Permanent rivers/ streams/ creeks | L: Permanent inland deltas | Y: Permanent Freshwater springs; oases | N: Seasonal/ intermittent/ irregular rivers/ streams/ creeks | O: Permanent freshwater lakes | Tp: Permanent freshwater marshes/ pools | P: Seasonal/ intermittent freshwater lakes | Ts: Seasonal/ intermittent freshwater marshes/ pools on inorganic soils | Tp: Permanent freshwater marshes/ pools | W: Shrub-dominated wetlands | Xf: Freshwater, tree-dominated wetlands | Ts: Seasonal/ intermittent freshwater marshes/ pools on inorganic soils | U: Permanent Non-forested peatlands | Xp: Permanent Forested peatlands | Va: Montane wetlands | Vt: Tundra wetlands | Q: Permanent saline/ brackish/ alkaline lakes | R: Seasonal/ intermittent saline/ brackish/ alkaline lakes and flats | Sp: Permanent saline/ brackish/ alkaline marshes/ pools | Ss: Seasonal/ intermittent saline/ brackish/ alkaline marshes/ pools | Zg: Geothermal wetlands | Zk(b): Karst and other subterranean hydrological systems [↑](#footnote-ref-9)
10. 1: Aquaculture ponds | 2: Ponds | 3: Irrigated land | 4: Seasonally flooded agricultural land | 5: Salt exploitation sites | 6: Water storage areas/Reservoirs | 7: Excavations | 8: Wastewater treatment areas | 9: Canals and drainage channels or ditches | Zk(c): Man-made subterranean hydrological systems [↑](#footnote-ref-10)
11. Potential | Actual (minor impacts) | Actual (major impacts) [↑](#footnote-ref-11)
12. No change | increase | decrease | unknown [↑](#footnote-ref-12)
13. A. Tropical humid climate | B. Dry climate | C. Moist Mid-Latitude climate with mild winters | D. Moist Mid-Latitude climate with cold winters | E. Polar climate with extremely cold winters and summers | H. Highland [↑](#footnote-ref-13)
14. Af: Tropical wet (No dry season) | Am: Tropical monsoonal (Short dry season; heavy monsoonal rains in other months) | Aw: Tropical savanna (Winter dry season) | BWh: Subtropical desert (Low-latitude desert) | BSh: Subtropical steppe (Low-latitude dry) | BWk: Mid-latitude desert (Mid-latitude desert) | BSk: Mid-latitude steppe (Mid-latitude dry) | Csa: Mediterranean (Mild with dry, hot summer) | Csb: Mediterranean (Mild with dry, warm summer) | Cfa: Humid subtropical (Mild with no dry season, hot summer) | Cwa: Humid subtropical (Mild with dry winter, hot summer) | Cfb: Marine west coast (Mild with no dry season, warm summer) | Cfc: Marine west coast (Mild with no dry season, cool summer) | Dfa: Humid continental (Humid with severe winter, no dry season, hot summer) | Dfb: Humid continental (Humid with severe winter, no dry season, warm summer) | Dwa: Humid continental (Humid with severe, dry winter, hot summer) | Dwb: Humid continental (Humid with severe, dry winter, warm summer) | Dfc: Subarctic (Severe winter, no dry season, cool summer) | Dfd: Subarctic (Severe, very cold winter, no dry season, cool summer) | Dwc: Subarctic (Severe, dry winter, cool summer) | Dwd: Subarctic (Severe, very cold and dry winter, cool summer) | ET: Tundra (Polar tundra, no true summer) | EF: Ice Cap (Perennial ice) | H: Highland (-) [↑](#footnote-ref-14)
15. Usually permanent water present | Usually seasonal, ephemeral or intermittent water present | Unknown [↑](#footnote-ref-15)
16. Water inputs from precipitation | Water inputs from surface water | Water inputs from groundwater | Marine water | Unknown [↑](#footnote-ref-16)
17. Feeds groundwater | To downstream catchment | Marine | Unknown [↑](#footnote-ref-17)
18. Water levels largely stable | Water levels fluctuating (including tidal) | Unknown [↑](#footnote-ref-18)
19. Food for humans | Fresh water | Wetland non-food products | Biochemical products | Genetic materials [↑](#footnote-ref-19)
20. Sustenance for humans (e.g., fish, molluscs, grains) | Drinking water for humans and/or livestock | Water for irrigated agriculture | Water for industry | Water for energy production (hydro-electricity) | Timber | Fuel wood/fibre | Peat | Livestock fodder | Reeds and fibre | Other | Extraction of material from biota | Medicinal products | Genes for tolerance to certain conditions (e.g., salinity) | Genes for resistance to plant pathogens | Ornamental species (live and dead) [↑](#footnote-ref-20)
21. not relevant for site | Low | Medium | High [↑](#footnote-ref-21)
22. Maintenance of hydrological regimes | Erosion protection | Pollution control and detoxification | Climate regulation | Biological control of pests and disease | Hazard reduction [↑](#footnote-ref-22)
23. Groundwater recharge and discharge | Storage and delivery of water as part of water supply systems for agriculture and industry | Soil, sediment and nutrient retention | Water purification/waste treatment or dilution | Local climate regulation/buffering of change | Regulation of greenhouse gases, temperature, precipitation and other climactic processes | Support of predators of agricultural pests (e.g., birds feeding on locusts) | Flood control, flood storage | Coastal shoreline and river bank stabilization and storm protection [↑](#footnote-ref-23)
24. Recreation and tourism | Spiritual and inspirational | Scientific and educational [↑](#footnote-ref-24)
25. Recreational hunting and fishing | Water sports and activities | Picnics, outings, touring | Nature observation and nature-based tourism | Inspiration | Cultural heritage (historical and archaeological) | Contemporary cultural significance, including for arts and creative inspiration, and including existence values | Spiritual and religious values | Aesthetic and sense of place values | Educational activities and opportunities | Important knowledge systems, importance for research (scientific reference area or site) | Long-term monitoring site | Major scientific study site | Type location for a taxon [↑](#footnote-ref-25)
26. Biodiversity | Soil formation | Nutrient cycling | Pollination [↑](#footnote-ref-26)
27. Supports a variety of all life forms including plants, animals and microorganizms, the genes they contain, and the ecosystems of which they form a part | Sediment retention | Accumulation of organic matter | Storage, recycling, processing and acquisition of nutrients | Carbon storage/sequestration | Support for pollinators [↑](#footnote-ref-27)
28. Public land (unspecified) | National/Federal government | Provincial/region/state government | Local authority, municipality, (sub)district, etc. | Other public ownership [↑](#footnote-ref-28)
29. Cooperative/collective (e.g., farmers cooperative) | Commercial (company) | Foundation/non-governmental organization/trust | Religious body/organization | Other types of private/individual owner(s) [↑](#footnote-ref-29)
30. Unspecified mixed ownership | No information available | Commoners/customary rights [↑](#footnote-ref-30)
31. Housing and urban areas | Commercial and industrial areas | Tourism and recreation areas | Unspecified development [↑](#footnote-ref-31)
32. Low impact | Medium impact | High impact | unknown impact | [↑](#footnote-ref-32)
33. Drainage | Water abstraction | Dredging | Salinisation | Water releases | Canalisation and river regulation [↑](#footnote-ref-33)
34. Annual and perennial non-timber crops | Wood and pulp plantations | Livestock farming and ranching | Marine and freshwater aquaculture | Non specified [↑](#footnote-ref-34)
35. Oil and gas drilling | Mining and quarrying | Renewable energy | Unspecified [↑](#footnote-ref-35)
36. Roads and railroads | Utility and service lines (e.g., pipelines) | Shipping lanes | Aircraft flight paths | Unspecified [↑](#footnote-ref-36)
37. Hunting and collecting terrestrial animals | Gathering terrestrial plants | Logging and wood harvesting | Fishing and harvesting aquatic resources | Unspecified [↑](#footnote-ref-37)
38. Recreational and tourism activities | (Para)military activities | Unspecified/others [↑](#footnote-ref-38)
39. Fire and fire suppression | Dams and water management/use | Vegetation clearance/ land conversion | Unspecified/others [↑](#footnote-ref-39)
40. Invasive non-native/ alien species | Problematic native species | Introduced genetic material | Unspecified [↑](#footnote-ref-40)
41. Household sewage, urban waste water | Industrial and military effluents | Agricultural and forestry effluents | Garbage and solid waste | Air-borne pollutants | Excess heat, sound, light | Unspecified [↑](#footnote-ref-41)
42. Volcanoes | Earthquakes/tsunamis | Avalanches/landslides | Unspecified [↑](#footnote-ref-42)
43. Habitat shifting and alteration | Droughts | Temperature extremes | Storms and flooding | Unspecified [↑](#footnote-ref-43)
44. World Heritage site | UNESCO Biosphere Reserve | Other global designation [↑](#footnote-ref-44)
45. whole | partly [↑](#footnote-ref-45)
46. EU Natura 2000 | Other international designation [↑](#footnote-ref-46)
47. Important Bird Area | Important Plant Area | Other non-statutory designation [↑](#footnote-ref-47)
48. Legal protection [↑](#footnote-ref-48)
49. Proposed | Partially implemented | Implemented [↑](#footnote-ref-49)
50. Catchment management initiatives/controls | Improvement of water quality | Habitat manipulation/enhancement | Hydrology management/restoration | Re-vegetation | Soil management | Land conversion controls | Faunal corridors/passage [↑](#footnote-ref-50)
51. Threatened/rare species management programmes | Reintroductions | Control of invasive alien plants | Control of invasive alien animals [↑](#footnote-ref-51)
52. Management of water abstraction/takes | Regulation/management of wastes | Livestock management/exclusion (excluding fisheries) | Fisheries management/regulation | Harvest controls/poaching enforcement | Regulation/management of recreational activities | Communication, education, and participation and awareness activities | Research [↑](#footnote-ref-52)
53. No | Yes | In preparation [↑](#footnote-ref-53)
54. All of Ramsar Site | Part of Ramsar Site [↑](#footnote-ref-54)
55. No need identified | No; the site has already been restored | No; but restoration is needed | No; but a plan is being prepared | Yes; there is a plan [↑](#footnote-ref-55)
56. All of Ramsar Site | Part of Ramsar Site [↑](#footnote-ref-56)
57. Water regime monitoring | Water quality | Soil quality | Plant community | Plant species | Animal community | Animal species (please specify) | Birds [↑](#footnote-ref-57)
58. Implemented | Proposed [↑](#footnote-ref-58)