Information Sheet on EAA Flyway Network Sites

(SIS) – 2013 version

Available for download from http://www.eaaflyway.net/nominating-a-site.php#network

Categories approved by Second Meeting of the Partners of the East Asian-Australasian Flyway Partnership in Beijing, China 13-14 November 2007 - Report (Minutes) Agenda Item 3.13

Notes for compilers:

1. The management body intending to nominate a site for inclusion in the East Asian - Australasian Flyway Site Network is requested to complete a Site Information Sheet. The Site Information Sheet will provide the basic information of the site and detail how the site meets the criteria for inclusion in the Flyway Site Network.

2. The Site Information Sheet is based on the Ramsar Information Sheet. If the site proposed for the Flyway Site Network is an existing Ramsar site then the documentation process can be simplified.

3. Once completed, the Site Information Sheet (and accompanying map(s)) should be submitted to the Flyway Partnership Secretariat. Compilers should provide an electronic (MS Word) copy of the Information Sheet and, where possible, digital versions (e.g. shapefile) of all maps.

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1. Name and contact details of the compiler of this form:

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EAAF SITE CODE FOR OFFICE USE ONLY:

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2. Date this sheet was completed:

October 2014

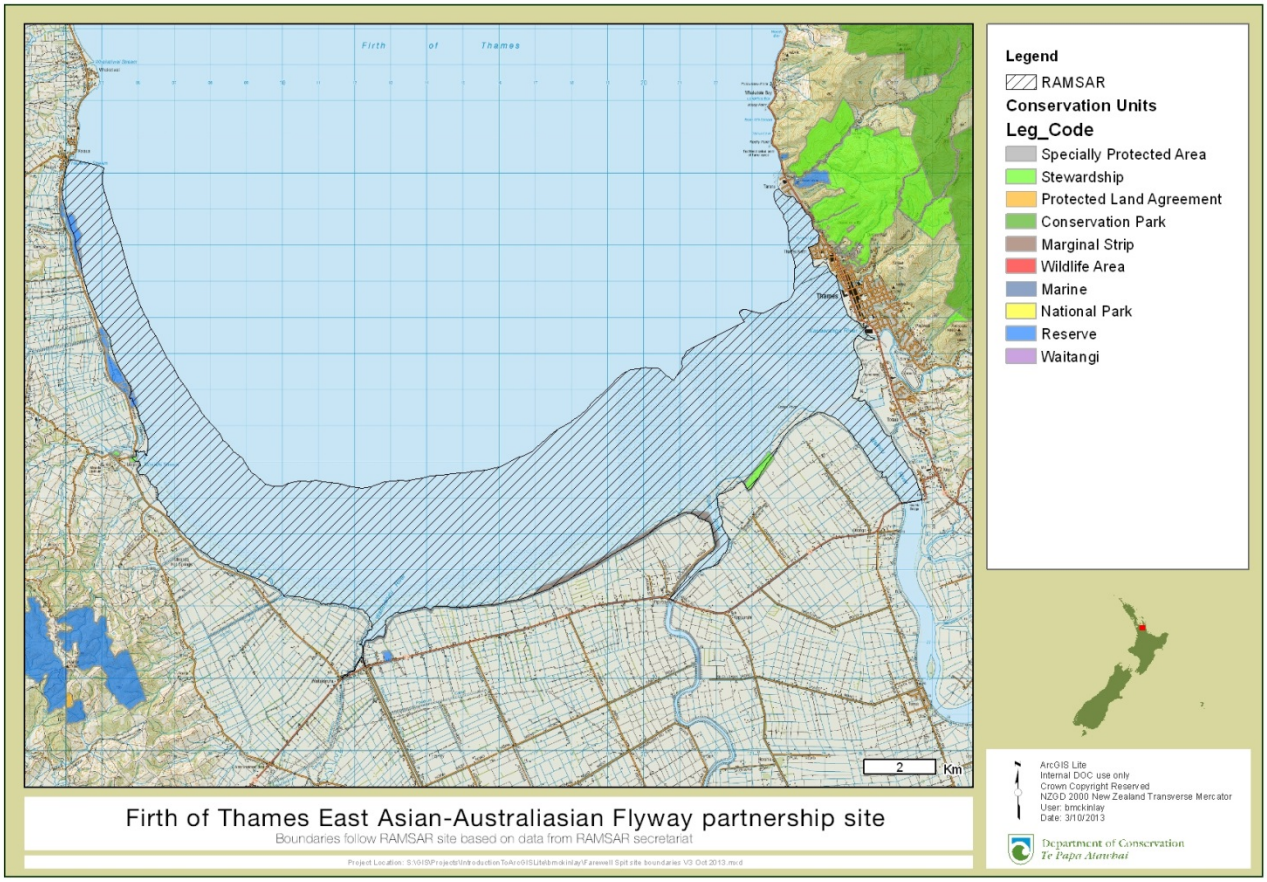
3. Country:

New Zealand

4. Name of the Flyway Network site:

Firth of Thames

5. Map of site:



http://www.eaaflyway.net/documents/network/googlemap/EAAF018_Farewell%20Spit.kmz

6. Geographical coordinates (latitude/longitude, in decimal degrees):

37°.12'.17.87" S. 175° 25"05.05" E

7. Elevation:

SEA LEVEL

8. Area:

9000 ha

9. General overview of the site:

8500 ha of intertidal flats provide foraging for internationally important numbers of migratory shorebirds, with major high tide roost sites occurring on adjacent shell ridges (cheniers) and shallow pools. The extremely high use of the littoral zone of the Firth of Thames by wildlife of immense conservation value indicates a need for more specific national protection mechanisms. Currently, minimal protection is afforded under the Ramsar designation together with the guiding principles behind the Hauraki Gulf Marine Park, of which it is a part (Battley and Brownell 2007).

10. Justification of Flyway Site Network criteria:

5755 Bar-tailed godwit (2012 count) 4.4 % of population

2820 Red Knot (2012 count) 4.7 % of population (*rogersi*)

11. Wetland Types:

The shallow tidal flats of the Firth of Thames, exposed at ebb tide, cover approximately 8,500 ha and can be divided into four main wetland types: shallow estuarine water and mudflats (7,000 ha); grass flats (30 ha); and mangrove forest, saltmarsh and swamp (730 ha), and shell banks (40 ha). The shell banks are used as high tide roosts by many birds, while adjacent grass flats are used for feeding and as roosts by some species.

G -- **Intertidal mud, sand or salt flats**

F -- **Estuarine waters**; permanent water of estuaries and estuarine systems of deltas

I -- **Intertidal forested wetlands**; includes mangrove swamps, nipah swamps and tidal freshwater swamp forests

H -- **Intertidal marshes**; includes salt marshes, salt meadows, saltings, raised salt marshes; includes tidal brackish and freshwater marshes.

B -- **Marine subtidal aquatic beds**; includes kelp beds, sea-grass beds, tropical marine meadows.

E -- **Sand, shingle or pebble shores**; includes sand bars, spits and sandy islets; includes dune systems and humid dune slacks.

12. Jurisdiction:

Hauraki District Council, Waikato District Council, and Waikato Regional Council.

Department of Conservation Hauraki Office

13. Management authority:

Waikato Regional Council
Hilke Giles – Programme Manager Coasts, land and wetlands
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Or
Amy Robinson – coastal team leader
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Department of Conservation
Department of Conservation
Hauraki Office
Bridget Baynes
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THAMES 3540

Note the Hauraki Collective, a grouping of 11 Iwi from around the region of the FSN site have reached a settlement with the Crown under the Treaty of Waitangi Settlement Act. This is likely to impact management policies for the FSN site, most probably in the form of co-governance with the Crown.

14. Bibliographical references:

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.) Muddy feet: Firth of Thames Ramsar site update 2004. Ecoquest Foundation, East Caost Road, Kaiaua RD3 Pokeno, New Zealand. ISBN 0 9582329-1-1

B. Brownell, J. Dahm and M. Graeme. 2008. Priorities and Related Actions for the Sustainable Management of the Firth of Thames Ramsar site. Muddy Feet Phase II: Keep the Birds Coming Environment Waikato Technical Report 2008/15

Cromarty and Scott. 1996. A Directory of Wetlands in New Zealand http://www.doc.govt.nz/Documents/science-and-technical/nzwetlands03.pdf

Dowding,J.E.; and S.J. Moore. 2006. Habitat networks of indigenous shorebirds in New Zealand SCIENCE FOR CONSERVATION 261 http://www.doc.govt.nz/Documents/science-and-technical/sfc261a.pdf

Elmetri, I. and Felsing, M. 2006: Application of the Relative Risk Model (RRM) to Investigate Multiple Risks to the Miranda Ramsar Site. Report prepared for Environment Waikato. Cawthron Report 1141.

Hauraki Gulf Forum. 2011. State of our Gulf: Tikapa Moana –Hauraki Gulf state of the Environment report ISSN 978 1 927169.89.6 Online.

Southey, I. 2009. Numbers of waders in New Zealand 1994–2003. DOC Research & Development series 308 ISSN 1177–9306 (web PDF)

Swales A.; Bell R.G.; Ovenden R.; Hart C.; Horrocks M.; Hermanspahn N.; and Smith R.K. 2007. Mangrove-habitat expansion in the Southern Firth of Thames: sedimentation processes and coastal-hazards mitigation Environment Waikato Technical Report 2008/13, Environment Waikato, Hamilton

15. Physical features of the site:

The Firth of Thames is a shallow marine embayment occupying the northern part of the Hauraki Rift valley, or graben, which is bounded by fault lines along the Hunua Ranges in the west and the Coromandel ranges in the east. The Firth is between 11 and 14 nautical miles wide and reaches a maximum depth of 35 m near its northern limits. About 95% of the Firth is less than 30 m deep. The sea floor consists of fine clay, silt and sand sediments laid over pumice sands. The graded shell beach ridges between Miranda and Kaiaua are considered one of the best examples of sand and shell chenier plain, a landform unique in New Zealand and rare globally.

The Firth of Thames Ramsar Site (established January 1990) 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), and covers between 8500 and 9000 hectares (depending on shifting sediment deposits over time). The vast, open inter-tidal mudflats, the mangrove communities that now cover much of the upper reaches of the intertidal zone, and the terrestrial areas adjacent to the mudflats are built on varying proportions of marine and land-derived sediments, old shell banks and vegetative debris (Brownell 2004). For nearly all

of the coastal area covered by the Ramsar designation, the intertidal zone is between one and two km wide, with no more than a 1.5 m change in altitude between its outer and inner margins. The catchment of the Firth is approximately 3600 sq km.
Mean annual air temperature is about 13°C and average annual rainfall is 1,200 mm. Surface temperatures in the open waters of the Firth range from 11° to 24°.
The Firth of Thames catchment is a significant source of nutrients for the fertile waters and mudflats of the entire Hauraki Gulf, but up welling of deep water at the north-eastern margins of the Gulf is the greatest source of nutrient supply. These deep water nutrients, along with runoff from the catchment and decomposition of detritus (mainly in the mangrove zone) support abundant fish and littoral invertebrate populations, especially shellfish.

16. Physical features of the catchment area:

The Hauraki Plains occupy the southern extension of the Hauraki graben. The Waikato River originally flowed through the 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. The Waihou and Piako drain nearly all of the Hauraki Plains. Most of this area was once kahikatea forest and swampland, but it has been cleared and drained for agriculture, predominantly dairying. The wider Firth receives runoff from the Hunua and Coromandel catchments – both largely indigenous and exotic forest, and farmland. Much of the Hunua water is diverted to reservoirs for water supply to Auckland, but flood flows from Coromandel rivers (the Kauaeranga, Te Puru, Waiomu, Tapu and Te Mata rivers) can have a strong but temporary influence on sediment loading in the Firth.

17. Hydrological values:

Three major factors influence the circulation systems present in the Firth: the East Auckland Current, tides and prevailing winds. Residual water movement from the tide is almost zero, with weak ebb and flow currents in the upper Firth of less than 1cm/s. Wind induced currents show clockwise and anti-clockwise gyres throughout the water column within the Firth of Thames (Brownell 2004). The East Auckland Current flowing south-easterly, and north-westerly winds associated with El Nino oscillations, act as partial barriers to the movement of sediment out of the Firth, resulting in deposition and accretion especially along its southern and western margins. There is therefore net retention of a great volume of sediment brought in primarily by the Waihou and Piako Rivers. It is estimated the basin is infilling at an average rate of 1.5 mm per year.
The Waihou and Piako are the major rivers flowing into the Firth of Thames, and the source of most terrestrial sediment and nutrients. An extensive band of mangroves lines the southern edge of the Firth beyond which on the landward side is a network of stop banks. These were

constructed as part of the Hauraki Plains drainage scheme. Both stop banks and mangroves significantly modify the hydrology of the FOT Ramsar site.

18. General ecological features:

A total of 132 species of birds has been recorded on the Firth of Thames, primarily in the environs of Kaiaua/Miranda at the northwestern end of the Ramsar site. Of these, about sixty species are either abundant or common; the remainder are occasional or rare visitors. The Firth of Thames hosts approximately 35 000 shorebirds each year (mainly along the Miranda Coast and the wider Ramsar site extending further to the south and east). Of these, about 11 000 are Arctic breeders from Siberia and Alaska.

The shallow mud and silt tidal flats exposed at low tide in the Firth of Thames provide important feeding grounds for shorebirds. These tidal flats vary from one to 2.5 km in width at low water on a spring tide, and have historically held an abundance of favoured food items such as polychaete worms, shellfish, crabs and shrimps. The boundaries of the Firth of Thames Ramsar site include most of the estimated 8500 ha of intertidal mudflats.

Adjoining the Firth of Thames Ramsar site are extensive areas of mangrove forest, saltmarsh and pasture. The latter two are used by shorebirds primarily as roosting sites. Along the southwestern margin of the Firth is an extensive system of shell ridges or cheniers. The most recent shell ridge semi encloses an area of mudflat that is heavily used as both foraging and sub roosting areas by the main flocks of shorebirds. 500 metres inland from this ridge is an area of shallow pools (approx 12 ha) known as the Stilt Pools that is also heavily used as a roost site. On the highest tides in the cycle, the shell spit and Stilt Pools are the most important roost sites on the entire Firth of Thames. The Stilt Ponds are also important foraging areas for a number of shorebird species.

19. Noteworthy flora:

Predominant vegetation types adjoining the FSN site are mangrove, saltmarsh and exotic pasture. A rare endemic saltmarsh species *Mimulus repens* occurs in the Miranda area.

20. Noteworthy fauna:

The Firth of Thames supports internationally important populations of both Arctic-breeding and New Zealand breeding shorebird species. It is particularly important for endemic wrybill *Anarhynchus frontalis* supporting over 40 % of the entire population during the non-breeding season. The Firth of Thames is the most important wintering site for pied stilt *Himantopus himantopus* and third most important for pied oystercatcher *Haematopus finschi*. Other significant

taxa include black-billed gull *Larus bulleri,* white fronted tern *Sterna striata* and northern New Zealand dotterel *Charadrius obscurus aquilonius* (Dowding & Moore 2006*).*

The Ramsar Site provides wetland and estuarine habitats for many other coastal birds such as white-faced heron *Ardea novaehollandiae,* banded rail *Gallirallus philippensis*, and five species of shag (*Phalacrocorax spp*. and *Stictocarbo sp)*. The shellbanks of this area 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 and black-billed gulls and a few pairs of northern New Zealand dotterel. Three species of shags nest mainly in the fringing mangroves.

21. Social, economic and cultural values:

a) Describe if the site has any general social, economic and/or cultural values e.g., fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values:

The Firth of Thames supports both commercial and recreational fisheries, and aquaculture that are highly valued by local communities, although most activity takes place outside the actual Flyway Network Site. It was also a traditional food gathering region for Maori, and is part of a land settlement claim currently being negotiated by local iwi (indigenous tribal groupings) and the Crown.

b) Is the site considered of international importance 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? (Double-click the checkbox to check and choose "Checked" under "Default Value" from "Check Box Form Field Options" window)

No.

If yes, tick the box ❑ and describe this importance under one or more of the following categories:

I. Sites which provide 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: ☐
II. Sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland: ☐
III. Sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples: ☐
IV. Sites where 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: ☐

22. Land tenure/ownership:

a) Within the Flyway Network site:

The entire Firth of Thames Ramsar site consists of intertidal flats that are crown land administered by Waikato Regional Council.

Adjoining this are several key high tide roosts on Crown land and on private freehold land subject to a QEII National Covenant (which restricts activity to current land use, effectively preventing development.) The Stilt Pools which, on the higher tides comprise part of the most important roost sites on the Firth of Thames, fall entirely within the QEII Covenant.

b) In the surrounding area:

With two exceptions, all coastal land seaward of East Coast Road between Kaiaua and the Pukorokoro Stream is public land administered by Territorial Councils and the Department of Conservation. The two exceptions are one small block of private land (c.6ha) and the QEII Covenant block mentioned above. From the Pukorokoro Stream to the Waihou River, most adjoining land is freehold farmland protected from marine inundation by a system of stop banks.

23. Current land (including water) use:

a) Within the Flyway Network site:

Small scale commercial and recreational fishing
Eco tourism – particularly birding.
Grazing on adjacent pasture

b) In the surroundings/catchment:

Commercial and recreational fisheries and aquaculture in the Firth of Thames.
Predominantly agriculture – dairy and dry stock beef grazing in the catchment.
Forestry on the Coromandel Peninsula
Wildlife Refuge status applies to some of the coastal strip between Kaiaua and Pukorokoro.
Small urban settlements occur close to the FSN site.

24. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

a) Within the Flyway Network site:

As part of the Muddy Feet project (Brownell 2004) a relative risk assessment model was applied to the Firth of Thames Ramsar Site and catchment. (Elmetri and Felsing 2006).

Even though there is only minimal coastal development so far (mainly on the Thames Coast and in the mouths of the Waihou and Waitakaruru Rivers) and some pastoral farming along the south and west coasts of the Firth of Thames, there are potentially serious impacts on the near shore

marine ecosystem and coastal fringe that are critical to the survival of coastal birds. These actual and potential impacts include:

• Sedimentation

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. The risk analysis identified significant stressors and risks associated with accumulation of terrestrial sediment, particularly muds, in the southern Firth of Thames. Historically the Ramsar area was dominated by sandy intertidal environments and beaches which have now been extensively displaced by muddy environments. The greatest risk posed is to the tidal flats of the Ramsar site with lesser, but relatively important risks for the water column, the sub-tidal seabed, and stilt ponds.

Sediments smother the intertidal flats that wading birds are foraging on, and are a key driver of the recent expansion of mangroves, which reduces feeding and roosting habitat for many birds. Sub tidal flats are also affected. Sedimentation can cause increased turbidity and reduction of light which in turn affects growth rates of phytoplankton and seabed algal communities. Deposition of mud may have short and long-term impacts by changing the structure of benthic communities (for example, from communities dominated by bivalve molluscs to communities dominated by polychaete worms). Increased concentrations of suspended sediments also influence nutrient and oxygen availability, and thereby negatively impact on filter-feeding bivalves such as horse mussels, pipi, scallops and cockles. Many nutrients and contaminants are also thought to be delivered and retained through attachment to sediments.

The sedimentation changes are thought to be associated with changes in the sediment budget of the southern firth arising from the following:

- Enhanced sediment input from terrestrial environments, particularly associated with historic land clearance activities. Current sediment supply rates from land are thought to be relatively low. However because of the large catchment area the total sediment input is still high and there are concerns associated with intensification of land use.
- Loss of wetland and other environments that once acted as sinks for large sediment volumes. For instance the drainage and development of the Hauraki Plains, and the construction of stopbanks all along the coast from the Waihou River mouth to the Miranda Stream resulted in the loss of over 32,000 ha of flood plain.
- Trapping and retention of mud from the existing sediment reservoir in the southern Firth by mangrove expansion.

These large-scale effects and changes demonstrate the potential for terrestrial inputs to significantly alter the coastal environment. The role of the existing sediment reservoir indicates that even if sediment run-off from land is reduced, trends of increasing sedimentation could continue for a while. Land use is being intensified in the catchment of the Firth of Thames,

including potential conversion of large areas of pine forests to dairy pasture (mainly along the southern margins of the catchment). The potential impact on sediment run-off is not yet known. The highest loads of sediments, contaminants and nutrients are often associated with seasonal or periodic flood events. The frequency of these flood events may change with global climate change effects, increasing the risks.
This sedimentation is considered in the Waikato Coastal Management Strategy September 2014. River and harbour catchment management. programmes led by Waikato Regional Council, particularly the Kaimai-Mamaku catchment, Waihou River and Piako River schemes, to reduce sedimentation and nutrient inputs to the Wetland from the Hauraki Plains.

• **Nutrient enrichment**

Elevated nutrient run-off (particularly nitrogen and phosphorus from effluent and fertilisers) can cause eutrophication of water bodies. This can lead to changes in pH, plant growth (including phytoplankton blooms and macroalgae), oxygen depletion, and increased turbidity associated with phytoplankton blooms. Investigations and modeling show that rivers are a significant and often dominant source of nutrients for the Firth of Thames, although upwelling can also supply nutrient-rich water to the firth dependent on offshore conditions. Preliminary modelling suggests that a significant increase in long-term nutrient loading from the firth catchments (for example, in response to more intensive land use) could alter firth nutrient dynamics, including short-term increases in phytoplankton levels (for example, algal blooms).
There are also strong links with the sediment issue. Nutrient loads are often associated with sediment run-off and the effects of the nutrients can be complicated by their interaction with the high levels of suspended sediment within the firth. Suspended sediments can act to limit primary production and therefore nutrient uptake by phytoplankton and benthic algae. Nutrients may also be contributing to the trend for mangrove expansion observed over the past few decades.
Urban sewage has not been detected as a problem in the firth (but see Coastal Subdivision below) although there is potential for operational breakdowns and leachate from landfill sites to lead to serious water contamination.
There is concern that existing policy is not adequate to enable regulators to consider potential cumulative effects (for example, enhanced nutrient run-off) when processing consent applications (Brownell et al 2008).

• **Contaminants** – pesticides, herbicides, fungicides, heavy metals and other toxins retained in the sediments from past and current mining, agriculture and industry in the catchment, as well as potential contaminants from marine sources such as boating pollutants.

• **Coastal subdivision** – sewage and stormwater toxins and excavation-derived sediments from residential developments (mainly in the Thames-Kopu area, and small settlements along the Kaiaua coast).

• **Expansion of marine farming** – and the possibility (depending on scale, locations and cumulative effects) of restricting the food supply (phytoplankton and zooplankton) of resident filter feeding invertebrates and fishes, creation of favourable habitat for undesirable invertebrate species, ingestion of large quantities of fish eggs by cultured mussels, and changes to the benthic ecology as a result of biological and non-biodegradable material originating from current shellfish (and, possibly, future cage fish) farming operations.

• **Seabed mining**

Not currently practiced, but from time to time a proposal to mine for gold residues in the seabed off Thames is revived. This is likely to disturb and redistribute heavy metal contaminants buried in the mud as a legacy of historical gold mining activities.

• **Climate change**

Short-term cycles (El Niño-Southern Oscillation) and long-term changes (sea level rise, mean water temperature increase, droughts, floods),

• **High-tide roost site destruction, disturbance and weed encroachment**

Invasive exotic species are resulting in a loss of feeding and roosting habitat through direct exclusion and increased risk from predators, as well as impacting on biodiversity. Exotic plants pose the main threat in foreshore and intertidal areas, including spartina and saltwater paspalum (*Paspalum vaginatum*), a variety of weed species that affect roosting areas, and the dominance of *Carex divisa* and tall fescue in supra-tidal riparian margins surrounding estuarine wetlands. Native species that are particularly threatened by invasive species include Maori musk (*Mimulus repens*) and the mistletoe *Ileostylis micranthus*.

Increasing recreational use is impacting important roosting areas along the margin of the chenier coast from Miranda to Kaiaua and, to a lesser extent, intertidal feeding sites. Pressures include campervans and pedestrian activity and associated animals (for example, dogs and cats). There is also increasing aircraft activity over the Ramsar site causing direct disturbance to birds (though some informal controls have been introduced).

• **Predation by introduced mammals**

Predation and disturbance from a variety of animal species is impacting on roosting and potential nesting habitat. Critical predators include cats, mustelids, rats, and hedgehogs. Unfenced cattle can also disturb birds and nesting areas. Minimal disturbance and low predation rates are critical for successful breeding. In some areas (for example, Waihou River mouth), the movement of sand

bars/shellbanks closer to shore, together with mangrove expansion, enhances predator access to roosting and breeding sites. Browsing by animal pests (for example, rabbits, rats) and unfenced stock can impact plant communities through physical disturbance, loss of seeds, and spread of invasive plants (Brownell et al 2008**).** Evidence of cat predation on non-breeding wrybills and pied oystercatchers has been recorded at Miranda (PFBattley unpubl. data). It is likely that predation by introduced mammals, and disturbance by cattle if not fenced well, contribute to the frequent abandonment of black-billed gull nests at Miranda. Growth of introduced weeds over formerly bare shellbanks provides cover for these predators and is a management issue that has received little attention to date. Whether the commonly occurring Australasian harriers (*Circus approximans*) affect breeding birds is unknown.

Other land usage

Drainage, stopbanking, infilling and associated land uses (for example, grazing and excavation) can result in both loss and degradation of intertidal and coastal habitat. Canal and stop bank management has in the past often been sporadic, and policies and approaches have sometimes been inconsistent. Stopbanks and drainage networks are being expanded without prior regard to sustainability, particularly with projected sea level rise and for very low lying areas. In addition, the geologically significant chenier shell ridges within the wider environs of the Ramsar site are being progressively modified by earthworks and shell extraction.

b) In the surrounding area:

Land use in the catchment is predominantly agricultural including extensive areas of intensive dairying. These areas are the source of most nutrients entering the Firth of Thames. Cattle grazing is an effective management tool for suppressing exotic vegetation, but causes significant detrimental effects – particularly runoff and ground pugging.

25. Conservation measures taken:

a) List national and/or international category and legal status of protected areas, including boundary relationships with the Flyway Network site:

In particular, if the site is partly or wholly a World Heritage Site and/or a UNESCO Biosphere Reserve, please give the names of the site under these designations.

The FSN site is essentially the area of the existing Ramsar site, although most important high tide roosts effectively lie outside the Ramsar boundaries. One such key area is subject to a QE II National Covenant. Scientific Wildlife Reserve status applies to parts of the coastal strip bordering the south west corner of the FSN site.

b) If appropriate, list the IUCN (1994) protected areas category/ies which apply to the site (tick the box or boxes as appropriate, see Annex 3):

Ia ☐; Ib ☐; II ☐; III ☐;IV ☐;V ☐; VI ☐; N/A ☐

c) Does an officially approved management plan exist; and is it being implemented?:
If yes, is it being implemented?: If no, is one being planned?

The FSN site falls within the scope of the Coastal Plan developed by Department of Conservation under the Resource Management Act 1991.
A Hauraki Gulf Marine Spatial Plan, *Sea Change* is currently in development, led by Auckland Council and Waikato Regional Council in collaboration with iwi, the Department, local authorities, Ministry for Primary Industries and other stakeholders to achieve integrated planning and management of the Hauraki Gulf, including the Wetland. The target date for completion is mid-2015.
Living waters is a joint project being developed by DOC and dairy co-op Fonterra aimed at improving shorebird roosting habitats and reducing sedimentation and nutrient inputs to the Wetland from catchments between Miranda and Kaiaua.

The Waikato Regional Plan
The Waikato Regional Plan (WRP) developed by the Waikato Regional Council focuses on land-based considerations. The three areas most relevant to the Firth of Thames and the Ramsar site are Section 3 – Water Module, Section 4 – River and Lake Bed module, and Section 5 – Land and Soil Module. These provide frameworks for management of water-borne influences from the land that are potentially detrimental to the health of the Firth of Thames ecosystem.
Objectives of water resources management most relevant to the inner Firth of Thames are:
• net improvement of water quality across the region
• avoidance of significant adverse effects on aquatic ecosystems
• enhance characteristics of flow regimes where practicable and where justified by the ecological benefits
• increase the extent and quality of the region's wetlands
• manage non-point source discharges of nutrients, faecal coliforms and sediment to levels consistent with identified purpose and values for which the water body is being managed
• preserve and protect natural character of the coastal environment, wetlands and lakes and rivers and their margins from inappropriate use and development
• ensure concentrations of contaminants leaching from land use activities and non-point source discharges to shallow ground water and surface waters do not reach levels that present significant risk to human health or aquatic ecosystems.

The most relevant river and lake bed objectives are:

• appropriately manage physical alterations to beds or banks of waterways, deliberate introduction of vegetation to the beds or banks of rivers and lakes, and access of livestock to banks and beds of rivers and lakes

• avoid accelerated infilling of estuaries, harbours and wetlands that are areas of significant indigenous vegetation and/or significant habitats of indigenous fauna

• achieve a net reduction in adverse effects of destabilisation of river and lake beds

• avoid introductions of those plant pests identified in the Waikato Regional Pest Management Strategy

• avoid competition from introduced vegetation with existent desirable plant species

• avoid obstruction of river channels by introduced vegetation

• remedy or mitigate cumulative adverse effects on the relationship tangata whenua (as kaitiaki) have with their identified taonga, for example; waahi tapu, native flora and fauna and access to customary fisheries

• maintain, where appropriate, existing legal public access to and along river and lake beds and their margins.

The key objective of land and soil management is to achieve a net reduction of accelerated erosion across the region so that there are no adverse effects on water quality, aquatic ecosystems and wetlands, no increase in the adverse effects of flooding or land instability hazards, and no accelerated infilling of lakes, estuaries, rivers and wetlands.

The gap analysis confirms that the policies set forth in the WRP generally provide a useful and adequate framework for addressing the risks causing the greatest concern to the RAMSAR site. However, one gap identified is a lack of policy promoting restoration of wetlands as sediment sinks around the Firth of Thames. Another is the need for a policy tool that will better manage cumulative off-site effects of increasingly intensive land use and discharges from industrial and municipal treatment plants.

The exclusion of livestock from ecologically sensitive waterways in the Waikato is an ongoing issue, and while progress has been made, significant grazing areas remain unimproved.

Waikato Regional Coastal Plan

The purpose of the Waikato Regional Coastal Plan (WRCP) is to enable Environment Waikato, in conjunction with the Minister of Conservation, to promote sustainable management and to achieve integrated management of the Coastal Marine Area (CMA). The Plan became fully operational in 2007 once the last outstanding section (Aquaculture) was agreed. The WRCP is the principal planning instrument that coordinates the management of all actions that occur within the Ramsar site and surrounding marine and coastal areas.

Waihou and Piako River Catchment works and services programmes
These programmes are managed by the River and Catchment Services Group of Waikato Regional Council in association with the relevant district councils (Hauraki District Council and Matamata-Piako District Council). They involve flood protection, water level controls, erosion control, river management, riparian management and drainage management.

d) Describe any other current management practices:
Pukorokoro Miranda Naturalists' Trust (PMNT) from time to time remove mangrove seedlings from the area immediately in front of the bird hides near the main high tide roosts. This area is used extensively by shorebirds for foraging and sub-roosting and would be lost to mangroves if management did not occur.
PMNT also manage trap lines for mammalian predators that extend for three km of the coastal strip and shoreline between Taramaire and Pukorokoro streams.
Annual summer (November) and winter (June) shorebird counts are done as part of a Birds New Zealand (Ornithological Society of New Zealand) census project.

26. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.
A project to restore and enhance roosting habitat at Miranda is in the early stages of development. This involves a partnership between dairy co-op Fonterra, the Department of Conservation, Pukorokoro Miranda Naturalists Trust and local landowners.
Further measures may be introduced once the Hauraki Gulf Marine Spatial Plan is completed and implemented after 2015.

27. Current scientific research and facilities:

e.g., details of current research projects, including biodiversity monitoring; existence of a field research station, etc.
There are currently no specific research facilities at the site although plans to expand the Pukorokoro Miranda Shorebird Centre include provision for a laboratory. Where appropriate or practicable PMNT assists field researchers with accommodation and other support. The Centre is used as a base for bird banding and wader counts of the Firth of Thames.

A census of shorebird populations is taken twice each year on the Firth of Thames. This Birds New Zealand (OSNZ) programme, in operation since 1960, has produced one of the longest data sets in the EAAF. From time to time birds are caught for banding using both cannon and mist nets. Most recently blood samples were taken from godwits as part of long-term research into the genetics of

shorebird migration strategies**.** Waikato Regional Council take monthly samples of water and sediments from areas all around the FSN site.

EcoQuest Education Foundation Te Rarangahau Taiao, affiliated with the University of New Hampshire in the US, is based 15 km from the Pukorokoro Miranda Shorebird centre. From time to time students conduct small scale research projects on or adjacent to the FSN site.

A University of Auckland study investigating chenier plain dynamics via marking and tracking cockle shells with PIT tags is proposed.

28. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:

e.g. visitors' centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

The Pukorokoro Miranda Naturalists' Trust owns and operates the Miranda Shorebird Centre located close to the main high tide roosts of the FSN site. Key objectives of MNT include raising awareness of coastal ecology and advocacy for shorebirds and their habitats. Built in 1990, the centre functions primarily as an information/education facility open 7 days a week, and offers natural history information and interpretation, education programmes and training courses. The centre features extensive natural history displays and dioramas and regularly hosts visits by schools and tertiary institutions along with service clubs and other community groups. The centre is staffed by one full-time resident manager, one part time assistant and a pool of volunteers. The centre relies on volunteers for much of its activities. For international birders Miranda is an essential stop. Two viewing hides are accessed by a trail from the centre, or a car park adjacent to the site. Research findings and other developments regarding coastal ecology and shorebirds are disseminated to MNT members through its quarterly magazine *Pukorokoro Miranda News.* Ecoquest Education and Research Foundation (See 27 above.)

PMNT has a long history of engagement with the EAAF and the Flyway Partnership. As a partner the PMNT fulfils an important role in promoting to a wider audience within New Zealand the objectives and programmes of the Partnership.

29. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

The Shorebird Centre attracts general visitors – an estimated 15-18,000 per annum. The MSC offers accommodation for visitors, and is an essential stop over for both domestic and international birders.

30. Threats

Which of the following threats is present historically – when the threat stopped but the effects are still there (H), currently (C) or potentially (P)?

	Historically	Currently	Potentially
Residential and commercial development			
housing and urban areas	☐	☐	☐
commercial and industrial areas	☐	☐	☐
tourism and recreation areas	☐	☐	☒
Agriculture and aquaculture			
annual and perennial non-timber crops	☐	☐	☐
wood and pulp plantations	☐	☐	☐
livestock farming and ranching	☒	☒	☒
marine and freshwater aquaculture	☐	☒	☒
Energy production and mining			
oil and gas drilling	☐	☐	☐
mining and quarrying	☒	☒	☒
renewable energy	☐	☐	☐
Transportation and service corridors			
roads and railroads	☐	☐	☐
utility and service lines	☐	☐	☐
shipping lanes	☐	☐	☐
flight paths	☐	☒	☒
Biological resource use			
hunting and collecting terrestrial animals	☐	☐	☐
gathering terrestrial plants	☐	☐	☐
logging and wood harvesting	☐	☐	☐
fishing and harvesting aquatic resources	☒	☒	☒

Human intrusions and disturbance			
recreational activities	☐	☒	☒
war, civil unrest and military exercises	☐	☐	☐
work and other activities	☐	☐	☐
Natural system modifications			
fire and fire suppression	☐	☐	☐
dams and water management/use	☐	☐	☐
other ecosystem modifications	☐	☐	☐
Invasive and other problematic species and genes			
invasive non-native/alien species	☐	☒	☒
problematic native species	☐	☒	☒
introduced genetic material	☐	☐	☐
Pollution			
household sewage and urban waste water	☐	☐	☐
industrial and military effluents	☐	☐	☐
agricultural and forestry effluents	☒	☒	☒
garbage and solid waste	☐	☐	☐
air-borne pollutants	☐	☐	☐
excess energy	☐	☐	☐
Geological events			
volcanoes	☐	☐	☐
earthquakes/tsunamis	☐	☒	☒
avalanches/landslides	☐	☐	☐
Climate change and severe weather			
habitat shifting and alteration	☐	☐	☐
droughts	☐	☐	☐
temperature extremes	☐	☐	☐
storms and flooding	☐	☒	☒

Please write here any additional threats and comments/queries you have on the threats.

Annex 1: Criteria for the inclusion of sites in the Flyway Site Network

(From the Partnership Text)

To be considered for inclusion in the Flyway Site Network, this Partnership adopts the following criteria:

a. Convention on Wetlands (Ramsar, Iran, 1971) criteria for internationally important sites for migratory waterbirds. That is:

   Criterion 2: A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.

   Criterion 5: A wetland should be considered internationally important if it regularly supports 20,000 or more waterbirds.

   Criterion 6: A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.

b. The staging criteria as applied under the Asia - Pacific Migratory Waterbird Conservation Strategy. That is:

   i. A staging site should be considered internationally important if it regularly supports 0.25% of individuals in a population of one species or subspecies of waterbirds on migration.

   ii. A staging site should be considered internationally important if it regularly supports 5,000 or more waterbirds at one time during migration.

c. Under exceptional circumstances a site can be nominated if it supports migratory waterbirds at a level or stage of their life cycle important to the maintenance of flyway populations. Justification of such nominations will be considered by the Partnership on a case by case basis.

Annex 2: Ramsar Classification System for Wetland Type

The codes are based upon the Ramsar Classification System for Wetland Type as approved by Recommendation 4.7 and amended by Resolutions VI.5 and VII.11 of the Conference of the Contracting Parties. The categories listed herein are intended to provide only a very broad framework to aid rapid identification of the main wetland habitats represented at each site.

To assist in identification of the correct Wetland Types to list in section 19 of the RIS, the Secretariat has provided below tabulations for Marine/Coastal Wetlands and Inland Wetlands of some of the characteristics of each Wetland Type.

Marine/Coastal Wetlands

A -- **Permanent shallow marine waters** in most cases less than six metres deep at low tide; includes sea bays and straits.

B -- **Marine subtidal aquatic beds**; includes kelp beds, sea-grass beds, tropical marine meadows.

C -- **Coral reefs**.

D -- **Rocky marine shores**; includes rocky offshore islands, sea cliffs.

E -- **Sand, shingle or pebble shores**; includes sand bars, spits and sandy islets; includes dune systems and humid dune slacks.

F -- **Estuarine waters**; permanent water of estuaries and estuarine systems of deltas.

G -- **Intertidal mud, sand or salt flats**.

H -- **Intertidal marshes**; includes salt marshes, salt meadows, saltings, raised salt marshes; includes tidal brackish and freshwater marshes.

I -- **Intertidal forested wetlands**; includes mangrove swamps, nipah swamps and tidal freshwater swamp forests.

J -- **Coastal brackish/saline lagoons**; brackish to saline lagoons with at least one relatively narrow connection to the sea.

K -- **Coastal freshwater lagoons**; includes freshwater delta lagoons.

Zk(a) – **Karst and other subterranean hydrological systems**, marine/coastal

Inland Wetlands

L -- **Permanent inland deltas**.

M -- **Permanent rivers/streams/creeks**; includes waterfalls.

N -- **Seasonal/intermittent/irregular rivers/streams/creeks**.

O -- **Permanent freshwater lakes** (over 8 ha); includes large oxbow lakes.

P -- **Seasonal/intermittent freshwater lakes** (over 8 ha); includes floodplain lakes.

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**.

Tp -- **Permanent freshwater marshes/pools**; ponds (below 8 ha), marshes and swamps on inorganic soils; with emergent vegetation water-logged for at least most of the growing season.

Ts -- **Seasonal/intermittent freshwater marshes/pools on inorganic soils**; includes sloughs, potholes, seasonally flooded meadows, sedge marshes.

U -- **Non-forested peatlands**; includes shrub or open bogs, swamps, fens.

Va -- **Alpine wetlands**; includes alpine meadows, temporary waters from snowmelt.

Vt -- **Tundra wetlands**; includes tundra pools, temporary waters from snowmelt.

W -- **Shrub-dominated wetlands**; shrub swamps, shrub-dominated freshwater marshes, shrub carr, alder thicket on inorganic soils.

Xf -- **Freshwater, tree-dominated wetlands**; includes freshwater swamp forests, seasonally flooded forests, wooded swamps on inorganic soils.

Xp -- **Forested peatlands**; peatswamp forests.

Y -- **Freshwater springs; oases**.

Zg -- **Geothermal wetlands**

Zk(b) – **Karst and other subterranean hydrological systems**, inland

Note: "**floodplain**" is a broad term used to refer to one or more wetland types, which may include examples from the R, Ss, Ts, W, Xf, Xp, or other wetland types. Some examples of floodplain wetlands are seasonally inundated grassland (including natural wet meadows), shrublands, woodlands and forests. Floodplain wetlands are not listed as a specific wetland type herein.

Human-made wetlands

1 -- **Aquaculture** (e.g., fish/shrimp) **ponds**

2 -- **Ponds**; includes farm ponds, stock ponds, small tanks; (generally below 8 ha).

3 -- **Irrigated land**; includes irrigation channels and rice fields.

4 -- **Seasonally flooded agricultural land** (including intensively managed or grazed wet meadow or pasture).

5 -- **Salt exploitation sites**; salt pans, salines, etc.

6 -- **Water storage areas**; reservoirs/barrages/dams/impoundments (generally over 8 ha).

7 -- **Excavations**; gravel/brick/clay pits; borrow pits, mining pools.

8 -- **Wastewater treatment areas**; sewage farms, settling ponds, oxidation basins, etc.

9 -- **Canals and drainage channels, ditches.**

Zk(c) -- **Karst and other subterranean hydrological systems**, human-made

Annex 3: IUCN Protected Areas Categories System

IUCN protected area management categories classify protected areas according to their management objectives. The categories are recognised by international bodies such as the United Nations and by many national governments as the global standard for defining and recording protected areas and as such are increasingly being incorporated into government legislation.

Ia Strict Nature Reserve
Category Ia are strictly protected areas set aside to protect biodiversity and also possibly geological/geomorphical features, where human visitation, use and impacts are strictly controlled and limited to ensure protection of the conservation values.

Ib Wilderness Area
Category Ib protected areas are usually large unmodified or slightly modified areas, retaining their natural character and influence without permanent or significant human habitation, which are protected and managed so as to preserve their natural condition.

II National Park
Category II protected areas are large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible, spiritual, scientific, educational, recreational, and visitor opportunities.

III Natural Monument or Feature
Category III protected areas are set aside to protect a specific natural monument, which can be a landform, sea mount, submarine cavern, geological feature such as a cave or even a living feature such as an ancient grove. They are generally quite small protected areas and often have high visitor value.

IV Habitat/Species Management Area
Category IV protected areas aim to protect particular species or habitats and management reflects this priority. Many Category IV protected areas will need regular, active interventions to address the requirements of particular species or to maintain habitats, but this is not a requirement of the category.

V Protected Landscape/ Seascape
A protected area where the interaction of people and nature over time has produced an area of distinct charcter with significant, ecological, biological, cultural and scenic value: and where safeguarding the

integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values.

VI Protected area with sustainable use of natural resources
Category VI protected areas conserve ecosystems and habitats together with associated cultural values and traditional natural resource management systems.