



# Pukorokoro Miranda Mangrove Seedling Removal Management Plan



**Submitted to:**

Pukorokoro Miranda Naturalists' Trust (PMNT)

April 2016

**Frontispiece:** View southward along shoreline immediately in front of the PMNT (southern) bird hide. The mangrove seedlings shown in the sea are less than 18 months old, about 15cm height, and are typical of the plants to be removed. The lagoon is a priority feeding area for migratory and other bird species.

## **Disclaimer**

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## **Appendices**

- A Mangrove Seedling Removal Fact and Training Sheet
- B Maps

# 1 Objective and Requirements

## 1.1 Objective

The objective of this Mangrove Seedling Management Plan (*the Plan*) is:

***To identify management practices and procedures to be adopted in order to minimise adverse effects of mangrove seedling removal and to comply with the conditions of consent.***

## 1.2 Minimum Requirements

The minimum requirements for the Plan as follows:

*The Plan shall:*

- (i) clearly define the zone for mangrove seedling management indicating priority areas for mangrove seedling removal and principal vegetation and wildlife habitat types, including high value adult mangrove areas and important saltmarsh communities;*
- (ii) Methods to be used to minimise disturbance of foreshore sediment, and seagrass and saltmarsh beds; and*
- (iii) The process to train and brief any personnel who will remove mangroves under this Plan and consent.*

In order to comply with the objective of this report, in addition to the requirements of consent, this report also needs to ensure that seedling removal will comply with:

- 1 Mangroves authorised for removal shall be seedlings. A seedling mangrove is defined as a young plant that has taken root in the substratum, has a single unbranched stem supporting 2-12 leaves, and is between 5 – 55 cm tall.*
  - 2 Seedling mangrove removal activity shall only take place during the months of July to September inclusive, generally mid-August to mid-September.*
  - 3 All personnel undertaking seedling removal activities are made aware of the PMNT Health and Safety plan -specifically the section pertaining to mangrove seedling removal.*
  - 4 All personnel undertaking seedling removal activities are made aware of this Plan and the need to follow the instruction of the PMNT appointed supervisor, including seedling removal techniques.*
  - 5 All personnel undertaking seedling removal activities are made aware of the conditions of resource consent and the need to comply with them,*
  - 6 The PMNT and all personnel involved shall ensure that seedling mangroves are hand cut or utilising (in low growth, non-sensitive, dense seedling areas) garden-type "weed eater" brushcutters and that the groups of personnel removing seedlings, from a specific seedling removal area in any one day, shall be restricted to a maximum of six people per 2,500 m<sup>2</sup> in areas of dense seagrass or saltmarsh plant communities as advised by a PMNT appointed supervisor. Instruction on*
-

*cutting methods, soft mud zones and demarcation areas shall be provided in personnel training.*

- 7 *Best endeavours shall be made to remove material within 48 hours of cutting, from the coastal marine area.*

This Plan is subject to approval by Waikato Regional Council pursuant to conditions of consent.

## 1.3 Purpose

The purpose of this management plan is to:

- Meet the requirements of the PMNT trustees;
- Provide a guide to operational staff for the implementation of this Plan (and consent); and
- Provide a guide and overview for staff.

This plan is operationally focused and is in relation to seedling mangrove removal only. The plan follows the advice contained in Wildlands Contract Report No. 3672 (April 20125) entitled Management of Mangrove Seedlings at Miranda-Pukokoro. The report provides background advice on mangroves in New Zealand and at Pukokoro Miranda, describes the potential ecological effects of mangrove seedling removal, provides criteria for assessment of values and effects (previously developed for WRC), evaluation and mapping (Maps 1 and 2) of Mangrove Management Zones and restoration opportunities.

The Wildlands (2015)report concludes:

- *there are no issues for mangrove seedling removal in areas where adult mangroves are absent or of low density*
  - *there are no issues with mangrove seedling removal in areas in close proximity to bird roosts*
  - *mangroves seedlings should be retained in areas of high-density adult mangroves*
  - *areas of mangrove seedlings within saltmarsh and rushland that are not used by shorebirds for intertidal roosting are a low priority for management. Note these are within the mangrove removal zone and areas less affected by mangrove seedling growth*
  - *Implementation of this management approach would ensure that there will be minimal adverse ecological effects of mangrove seedling removal, and will favour the persistence of the existing intertidal habitats of the Miranda shoreline. Areas of high-density adult mangroves will be retained by allowing for regeneration in these areas, and areas where adult mangroves are of low-density or absent will remain as open intertidal habitats.*
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## 2 Pukorokoro Miranda Mangrove Seedling Removal Management Zone

The mangrove seedling management zone (Map1) encompasses:

- land administered by Land Information New Zealand and described as Hydro Parcels;
- land administered by Department of Conservation and described as Conservation Area-Miranda, or
- privately owned land owned by Buxton T R and Lane J. This land has a Queen Elizabeth II Open Space Covenant over the block and on 2nd May 2016 (or thereabouts) is to become the property of Pukorokoro Miranda Naturalists' Trust.

Refer Map 3 for detail. The land is all east of the East Coast Road and for Crown-owned lands is in large part defined as Coastal Marine Area. This area also forms part of the Firth of Thames Ramsar site established in 1990.

### 2.1 Context to the Ecological Values of the Mangrove Seedling Removal Management Zone

Wildlands (2014) described the ecological context; vegetation and habitats; threatened, at risk, or regionally threatened species; ecological values; and, restoration issues and opportunities. Included is discussion on mangrove management. Mangrove seedling management is considered an activity necessary for the protection and maintenance of existing shorebird roosting and feeding habitat.

Of particular focus is the intertidal area between the active end of the shell spit and the bird watching hide, the principal high tide roosting area. In addition, sediment -filled channels immediately inward of the seaward-most chenier, and saline areas of streams and drains.

The Wildlands (2014) report also acknowledges mangroves as "a large, valuable, and major component of the Firth of Thames ecosystem". Issues, risks and management of mangroves has been the subject of discussion in a range of other reports including the WRC-supported Muddy Feet project report (Brownell et al, update 2004) and associated documents including Muddy Feet Phase II -Priorities and related Actions for the Sustainable Management of the Firth of Thames Ramsar Site (Environment Waikato,-2008) and Muddy Feet Phase III - Restoration Action Plan (Brownell, 2009).

### 2.2 Mangrove Seedling Removal Management Zone

Wildlands (2015) explain the criteria for determining the ecological effect of mangrove removal to both increasing and decreasing ecological values. Map 2 identifies the extent of the mangrove seedling management zone including those areas for which effects of removal will be beneficial ("no issue"), areas for which seedling should be protected and where there would be neutral effect (to seedling removal).

Within the Mangrove Seedling Management Zone vegetation type and habitat is either:

- channel and mudflats (Type 1 -no issue with mangrove seedling removal);
  - tidal roosts (Type 2 - no issue with mangrove seedling removal)
  - and, saltmarsh and rushland (Type 5 -neutral)
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PMNT accepts those Management Zone recommendations noting the area for mangrove seedling (only) removal.

### 3 Methods

A number of measures will be utilised to ensure any potential adverse effects of the activities are avoided or minimised. In particular care will be taken to minimise any adverse effects on native vegetation and wildlife habitats given that the activities are intended to maintain and enhance this vegetation and habitat in the Pukorokoro Miranda area. This section identifies the methods to be used for seedling mangrove removal to achieve this.

#### 3.1 General Principles

The following sets out the general principles under which seedling removal will be undertaken:

- Only single unbranched stem mangroves of no greater height than 55 cm will be removed;
- No seedling mangrove removal will be undertaken within stands of mature mangroves;
- Removal will only occur within the period from July- September annually;
- All personnel will be suitably trained and made aware of conditions of this Plan and consent within which they must work;
- Seedling mangroves will be hand cut or where seedling density is high by garden-type brushcutter only;
- The number of personnel will be restricted, to minimise damage in sensitive vegetation and habitat, to no more than 6 people in any area of up to 2500 square metres at a time in areas of dense seagrass or saltmarsh and rushland as identified by the PMNT supervisor;
- Seedling mangrove cutting will be undertaken at in daylight hours within 2 hours either side of low tide to minimise disturbance and to maximise removal;
- Seedling mangrove cuttings, applying best endeavours, shall be removed from the CMA for disposal within 48 hours of cutting.

#### 3.2 Removal Techniques

Removal protocol is:

- Removal is to be either by hand or by garden-type brushcutter;
  - Seedlings cut with hand held equipment will be by hand held saw, tree pruners or secators;
  - Brush cutters are only to be used where seedling density is greatest and where there is no potential for damage to non-target plant species
  - Every endeavour will be taken to remove material within 24 hours of cutting, from the Coastal Marine Area and disposed of appropriately;
  - Mangroves cut at ground level, maximum of 20mm above the estuary bed;
  - Personnel will operate in a group under the supervision of PMNT trustees approved team leader who shall limit the group size to maximum 6 in sensitive areas such as any dense seagrass areas or in saltmarsh communities. It is expected groups will be maximum 10, ideally 6 in all areas;
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- Where removal is in potential "soft mud" zones group size shall be maximum 6 and involve experienced personnel as approved by PMNT. In these areas boards, kayaks or "mud shoes" are to be available;
- Removal shall be strictly within the area defined in Map 2 (Wildlands 2013 report);
- No stockpiling of plant material will take place within the coastal marine area;
- No lone working is to be undertaken; and
- Seedling removal is to occur up to two hours either side of low tide only and during daylight hours.

### 3.3 Minimising Disturbance

Disturbance to significant habitats (seagrass beds and salt marsh habitat) and erosion potential will be minimised by:

- Using formed tracks to the shoreline where these exist;
- No motorised vehicles will be operated in the consent area associated with seedling removal.
- Groups of personnel in any one day may be reduced to a maximum of six people per 2,500 m<sup>2</sup> in areas of dense sea grass or saltmarsh community, as advised by a suitably qualified ecologist and as identified on the maps in Section 4.

## 4 Training

PMNT shall ensure all personnel undertaking seedling removal activities shall be made aware of the conditions of the resource consent, the need to comply with those conditions, and that those personnel are trained in appropriate seedling removal techniques.

The purpose of training will be to affirm consent parameters specific to this Plan and consent and ensure the PMNT Health and Safety Plan, specifically that pertaining to mangrove seedling removal, is adhered to.

Only those who have undergone PMNT approved training will be permitted to carry out removal works.

Training specifications include:

- Training managed by PMNT Site Manager (or his nominee);
- A record of all persons who have completed training and been involved in seedling removal will be kept.
- A fact and training sheet (see Appendix B), and a map showing removal area boundaries with access pathways (see Section 5), will be fully explained to all personnel. This shall include a map showing removal area boundaries with access pathways.

Training will include:

- Method for removal - mangrove seedlings cut at ground level.
  - Method for disposal - material removed from CMA.
  - Health and safety considerations.
  - Access points.
  - Minimising disturbance: moving around the estuary and shoreline, using firm ground, avoiding sea grass beds as far as practical.
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## Personal Protection

When undertaking mangrove seedling removal personnel shall operate with under the following PMNT Health and Safety Plan guidelines, including :

- **Personal Protective Equipment** Appropriate protective equipment must be supplied by PMNT, such as: sun screen, hat, appropriate foot wear – ie wet suit booties, gloves, life jacket if working in water.
- **Health and Safety Sign In** All those wishing to take part, must have read, understood and signed the Health and Safety forms.
- **Existing Conditions** If you have an existing health condition, please let us know, if you are allergic to wasp sting etc ensure you have your medication on hand and that someone you are working with knows about it.
- **Hazards** Working in and around water can be incredibly hazardous, consider timing of the work and never work alone (see below). Working with sharp objects can be dangerous, please ensure you are a safe distance from others when cutting, cut away from yourself. Please wash hands before eating/drinking after carrying out work. Other hazards to consider; deep mud, slipping, access ways, falling, cuts or scrapes, sun exposure.
- **Timing** Low tide, daylight hours.
- **Numbers** Don't work alone, work in threes, make sure someone knows where you are and when you will be home.

## 5 Acknowledgements

Dion Patterson (DOC) initiated this project. Catherine Beard (DOC) Keith Woodley (Pukorokoro Miranda Naturalists' Trust), Michelle Lewis (WRC) all provided useful contacts, comments and discussion.

## 6 References

Brownell B (Editor) 2004: Muddy Feet Firth of Thames Ramsar Site Update, published by EcoQuest Foundation

Brownell B.; Hillock K.; Beard C.; Wishart P.; Higham T. 2009: Muddy Feet Phase III: Getting stuck in. Restoration Action Plan and Ecotourism vision document. Prepared for Muddy Feet Steering Group

Environment Waikato 2008: Priorities and Related Actions for the Sustainable Management of the Firth of Thames Ramsar Site Muddy Feet phase II.

Environment Waikato Technical Report 20008/15

Wildlands Consultants Ltd 2014: Evaluation of Restoration Management Requirements at Miranda-Pukorokoro, contract report prepared for Department of Conservation

Wildlands Consultants Ltd 2015: Management of Mangrove Seedlings at Miranda-Pukorokoro, contract report prepared for Department of Conservation

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## Appendix A: Mangrove Seedling Removal Fact and Training Sheet

### Management of Mangroves

#### at Pukorokoro Miranda

#### **Mangrove Seedling Stages:**

All the forms shown on this sheet are considered to be seedlings.

All should be less than 55cm in height, generally less than 20cm.

**A** : New seedling with seed leaves only and a recently established root system.

**B**: Seedling in the first month of growth showing the first pair of true leaves.

**C**: Seedling in the first few months of growth with the second pair of true leaves emerging at the tip.

**D**: Seedling in the first year of growth: the root system is well established. The seed leaves (**E**) are still attached, will probably look brown and withered.

#### **Removal Technique:**

Make a single cut through the stem in the position shown by the dotted lines in the pictures below.

**Please note:** Seedlings should be **cut** -they should not be removed by pulling out the entire plant (pulling out the plant disturbs the mud too much, particularly in ecologically sensitive areas such as seagrass beds).

Apply best endeavours to remove the cut plants from the coastal marine area with 48 hours of cutting and dispose on land.

Removal must be in accordance with the Pukorokoro Miranda Mangrove Seedling Management Plan and with appropriate protective equipment

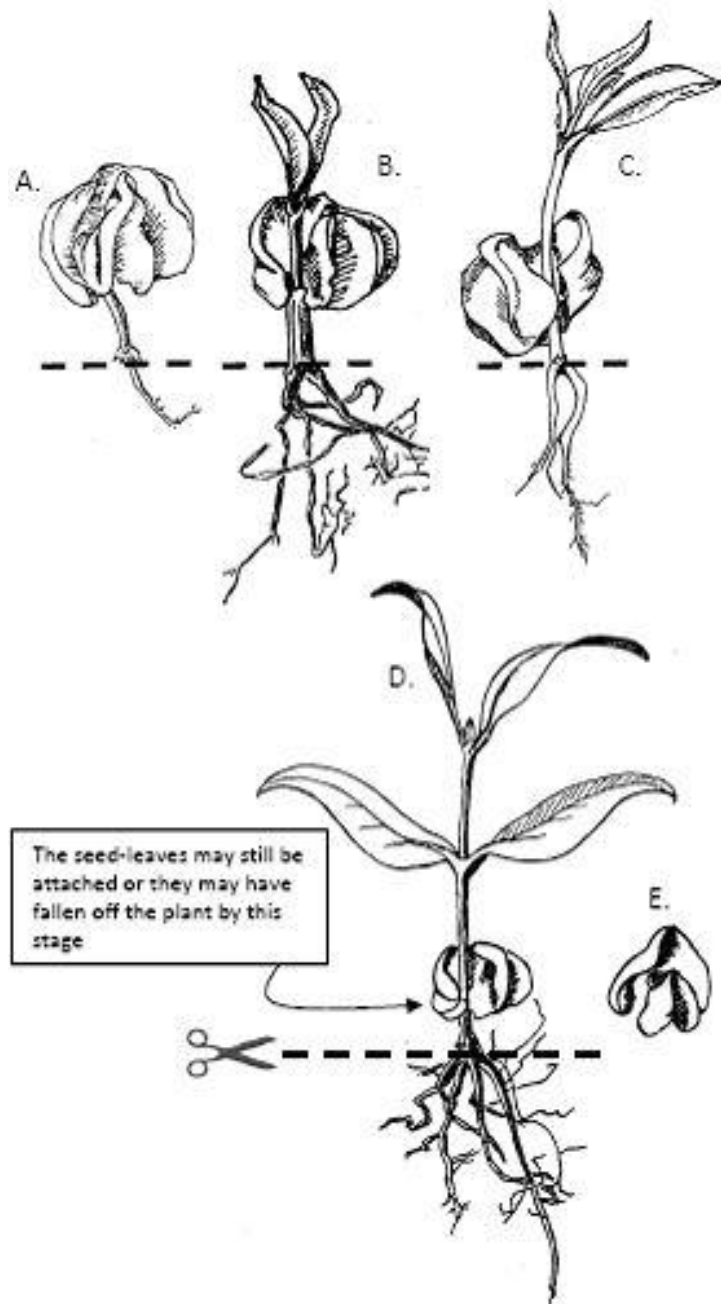
To minimise disturbance or damage to sensitive seagrass and saltmarsh plant communities, no more than six people shall work within any 2500 square metres at any time in such habitat. Elsewhere no more than 10 people may undertake the work at any one time within the defined seedling removal area - refer the Plan.

#### **Timing:**

The Mangrove Seedling Removal Plan (and consent) allows seedlings to be removed within the period Julyt-September inclusive, generally mid-August to mid-September. The period ensures nil or minimal disturbance to birdlife, especially migratory birds. Further, removal is to be conducted within 2 hours either side of low tide during daylight hours.

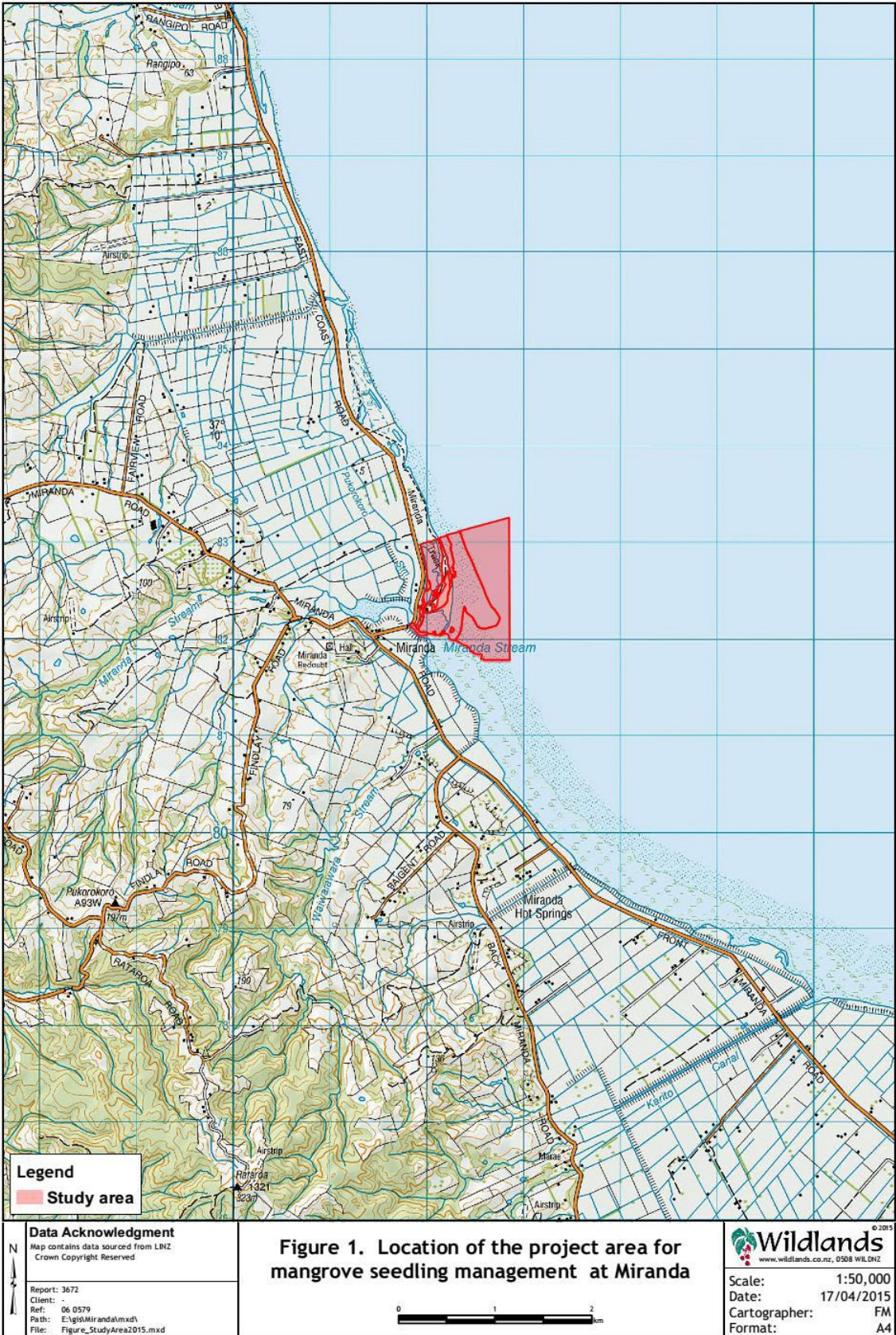
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All removal is to be conducted in accordance with instruction from the Pukorokoro Miranda Naturalists' Trust appointed supervisor.



Images adapted from [www.enhg.org/bulletin/b32/32\\_04](http://www.enhg.org/bulletin/b32/32_04)

# Maps:



**Legend**

Study area

**Data Acknowledgment**  
 Map contains data sourced from LINZ  
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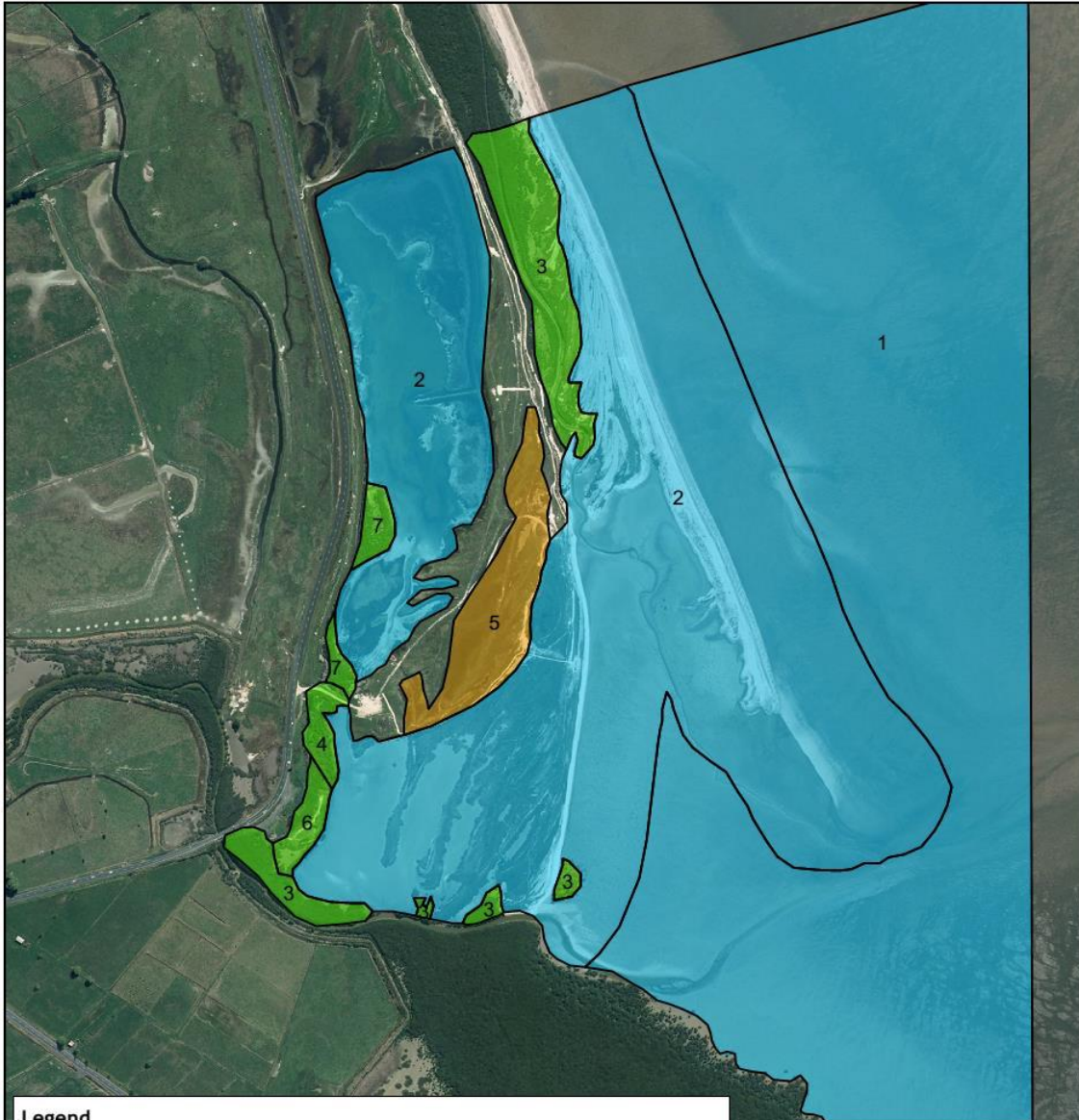
Report: 3672  
 Client: -  
 Ref: 06 0579  
 Path: E:\gis\Miranda\mxd\  
 File: Figure\_StudyArea2015.mxd

**Figure 1. Location of the project area for mangrove seedling management at Miranda**

0 1 2 km

**Wildlands** © 2015  
 www.wildlands.co.nz, 0908 WILDENZ

Scale: 1:50,000  
 Date: 17/04/2015  
 Cartographer: FM  
 Format: A4



**Legend**

**Vegetation and habitat type**

1. Channel and mudflats (score -4)
2. Tidal roosts (score -8)
3. High density, high value adult mangroves, no sequence (score 2)
4. High density, high value adult mangroves, terrestrial to marine sequence (score 3)
5. Saltmarsh and rushland, no sequence (score 0)
6. Saltmarsh and rushland, terrestrial to marine sequence (score 1)
7. High density, low value mangroves (score 1)

**Mangrove seedling management zone**

- No issue with mangrove seedling removal
- Mangrove seedlings to be protected
- Neutral

**Data Acknowledgment**  
 Map contains data sourced from LINZ  
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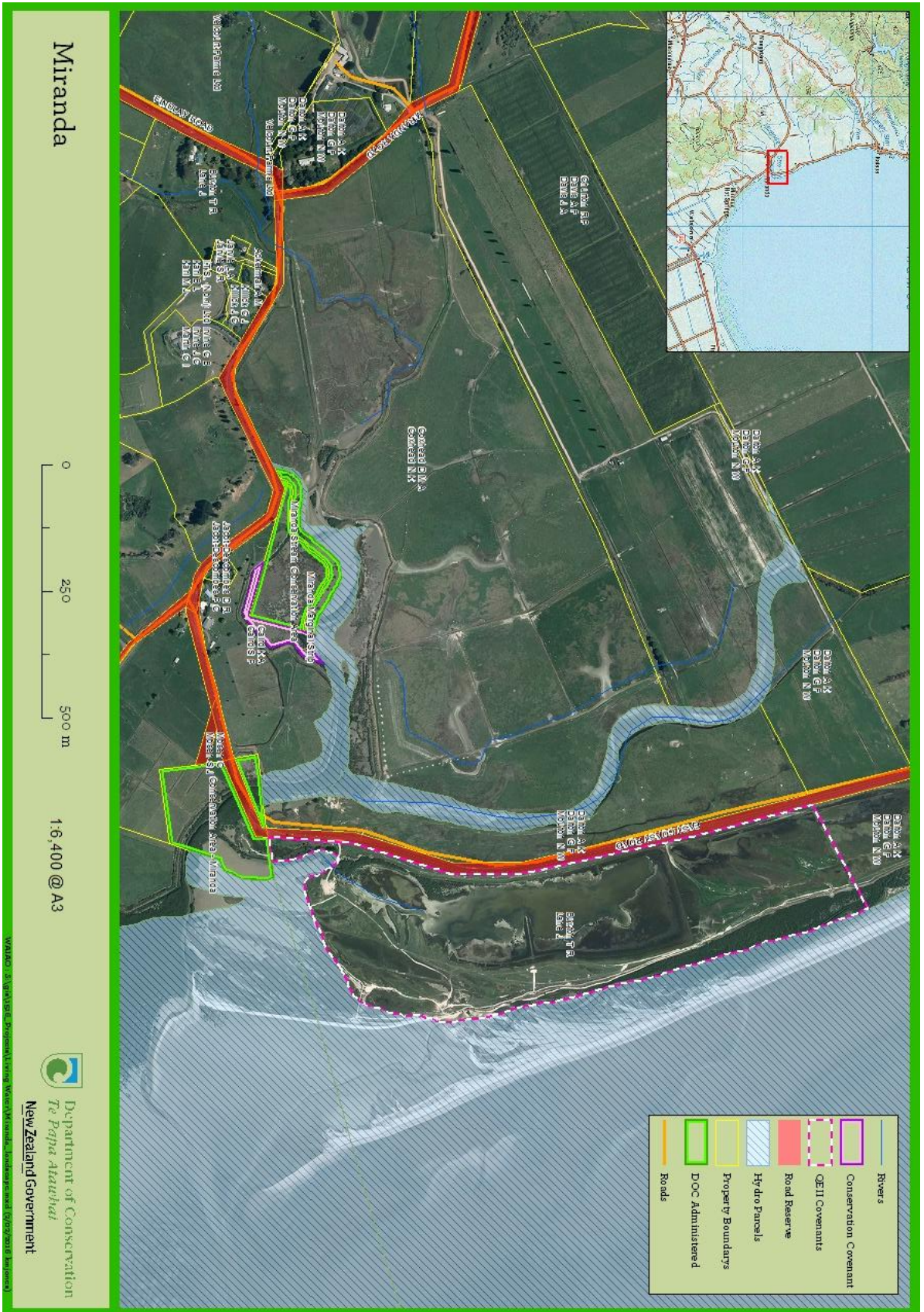
Report: 3672  
 Client: -  
 Ref: 06 0579  
 Path: E:\GIS\Miranda\mxd\  
 File: Figure\_vege\_management2015.mxd

**Figure 2. Mangrove seedling management zones for Miranda**

0 100 200 m

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Scale: 1:7,500  
 Date: 16/04/2015  
 Cartographer: FM  
 Format: A4



**Map 3: Miranda Stream: Land Tenure**

