



Resolution Island weed management strategy 2010-2020



Cover image - Fiordland Helicopters machine on Resolution Island tops, checking repeater site for introduced weeds, December 2010 (Richard Ewans)

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Resolution Island weed management strategy 2010- 2020

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Summary

Due to its remote location and limited access, weed management on Resolution Island relies on the work of all people visiting the Island. This strategy is designed to assist staff in successfully minimising weed impacts on Resolution Island.

This objective involves 3 main steps:

1. Quarantine: strict quarantine requirements when visiting the island to stop new weed incursions (Section 5).
2. Surveillance and monitoring: report any new weeds/new sites on the island and monitor existing weeds on the island (Section 6).
3. Control/eradication: manage existing weeds on the island (Section 7).

1. Background

Resolution Island (20,860ha) is the largest island in Fiordland and the 5th largest island in New Zealand. It is also the largest island in New Zealand on which pest eradication of stoats and red deer has been attempted. It is located in the southwest corner of Fiordland National Park between the entrances to Breaksea and Dusky Sounds. The island extends from sea level to the summit of Mt Clerke at 1069m.

Resolution Island has considerable ecological diversity with extensive mixed beech-podocarp forest, widespread scrub and shrubland communities, alpine areas with herbfields and tussock grasslands, wetland areas and a variety of coastal habitats. Twenty three exotic species have so far been identified and these are mainly restricted to sites of human disturbance such as bivvy sites, historical boat landing sites or coastal areas where seeds from pest plants such as gorse wash ashore.

Resolution Island is free of possums and rats but populations of red deer, stoats and mice are well established. Work to eradicate stoats and deer was initiated in 2008 (stoats) and 2009 (deer).

Resolution Island is classified under the Fiordland National Park Management Plan 2007 as a “Restoration” island in order to reflect its primary conservation function of the “recovery of viable populations of threatened species of particular communities” (p.92). This classification means that while restoration is paramount, the public can still visit the island at any time. Quarantine measures are in place for Departmental visitors (see Appendix 1) but there is an urgent need for DOC to educate and encourage other visitors to apply similar quarantine measures when visiting Resolution Island.

2. Objective

The objective of the Resolution Island Weed Management Strategy is to create clear guidelines for the surveillance, monitoring, and control of weeds on Resolution Island.

3. Introduction

This strategy outlines the current weed distribution on Resolution Island and provides clear guidelines, actions, and responsibilities to prevent new weed incursions and limit and/or reduce the extent of weeds already present on the Island.

Due to the remote location of Resolution Island most weed surveillance, monitoring, and control relies on the participation of all visitors to the Island. Managing any weed problem quickly while it is relatively contained is critical to the success of weed control particularly if the goal is eradication. Human visits pose the greatest threat of pest plant introductions and stringent quarantine is the essential first step in managing weeds on Resolution Island.

The appendices of this strategy are arranged in such a way as to act as a field kit for anyone visiting Resolution Island who may play a role in quarantine or surveillance. The Te Anau Area Programme Manager - Biodiversity is responsible for managing the weed programme for Resolution Island.

4. Current known distribution of weeds on Resolution Island

During an inventory of vegetation on Resolution Island in February/March 2008 (Department of Conservation, 2008) twenty three exotic species were recorded. An additional 7 new species have subsequently been recorded at two different bivvy sites, giving a total of 30 exotic plants species known on Resolution Island. Most of these are confined to open coastal areas with two rush species found within alpine and wetland habitats (jointed rush-*Juncus articulatus* at Mt Roa bivvy area, and bulbous rush-*Juncus bulbosus* at Mt Lort). Most of the weed species are grasses, rushes or small herbs; with the only woody shrub being gorse (*Ulex europeaus*).

Small numbers of gorse plants have been controlled annually at Woodhen and Disappointment Coves for a number of years by Te Anau Area weeds staff. These Coves both face north and prevailing ocean currents wash weed seeds into large drift wood zones. In addition they have been popular accessible landing points for many years and are correspondingly key establishment sites for weeds. Sixteen weed species have been recorded at Goose/Woodhen cove and 11 at Disappointment Cove.

The bivvy sites established as part of the pest eradication programme are a centre for human activity and disturbance and therefore high risk sites for weed invasion. Other likely sites for weed invasion are the VHF repeater on Mt Lort and the Five-Fingers Peninsula lighthouse landing site. During the 2009-10 and 2010-11 field seasons opportunistic surveys by field workers and one systematic survey and control operation via helicopter on the island have revealed weed incursions at all the new bivvy sites except for Mt. Wales and Mt. Roa. The worst was at North-west Biv where large patches of exotic grasses and rushes have established.

In addition to the current known weed locations any areas of previous human activity such as old deer pen sites should be checked.

Although quarantine measures have been in place for the last few years new weed incursions have still occurred. All infrastructure sites are high risk and continued vigilance will be required to keep them weed-free. The pattern of continued weed incursions at new bivvy and deer pen sites on Secretary Island suggests that weed management will need to be on-going.

Table 1 below show the current know weed sites on Resolution Island and Map 1 shows the high risk sites. Sites with the highest risk of weed invasion on Resolution Island are areas of human disturbance such as bivvys & associated helicopter landing sites, deer pens and the VHF repeater on Mt Lort. Historical sites for weeds are Woodhen/Goose Cove (the narrow isthmus between Five-Fingers Peninsula and main Resolution Island) and Disappointment Cove.

For details of managed weed species at all locations on Resolution Island see DOCDM-51626 (Fiordland coast weed histories).

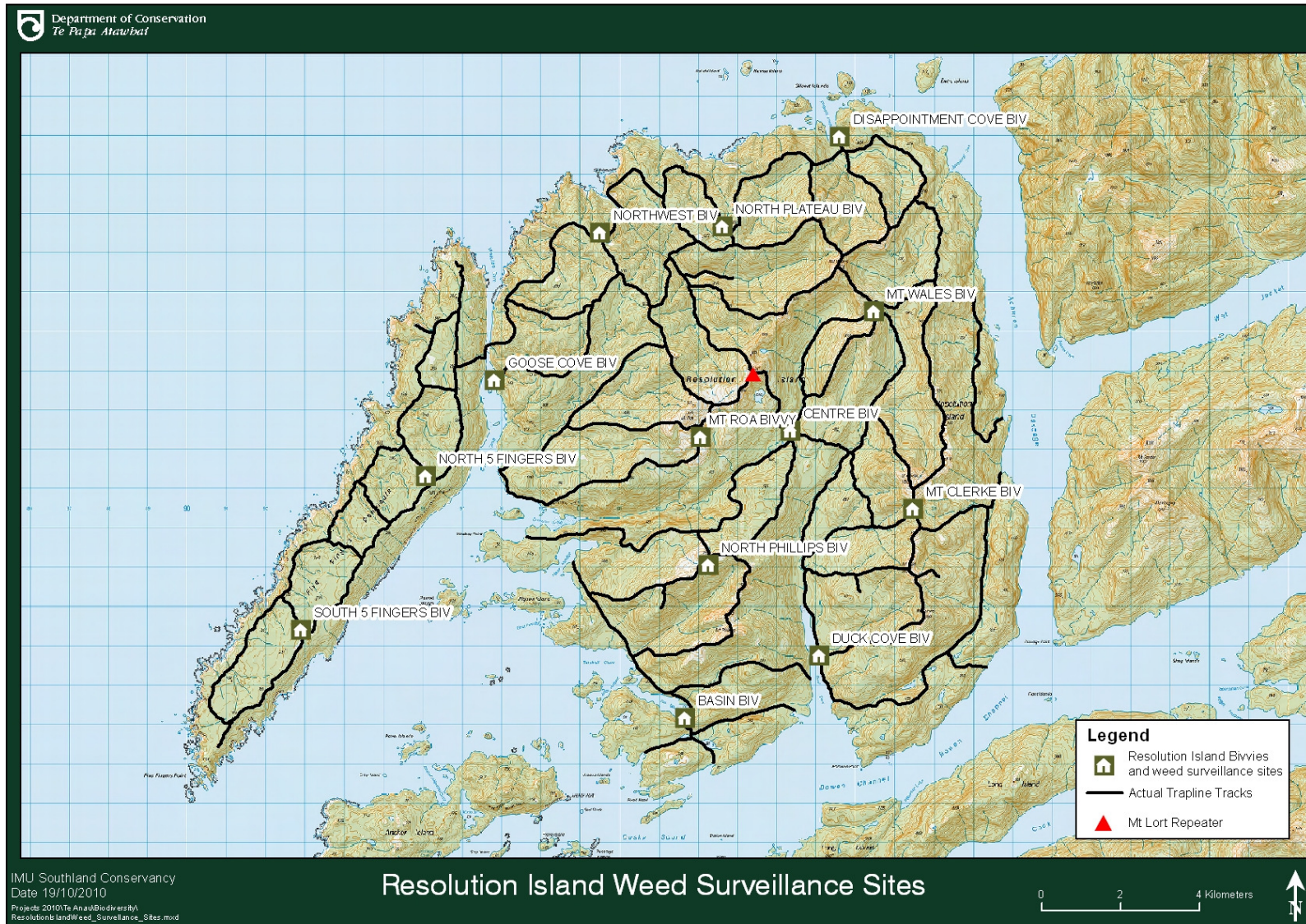
Table 1: Current known distribution of all exotic plants on Resolution Island, September 2010.

	COMMON NAME	SCIENTIFIC NAME	LOCATION OF WEEDS
1	Annual poa	<i>Poa annua</i>	Goose/Woodhen Cove; North-west Biv; South Five-Fingers Biv; Centre Biv
2	Birdsfoot trefoil	<i>Lotus pendunculatus</i>	Goose/Woodhen Cove
3	Browntop	<i>Agrostis capillaris</i>	Five-Fingers lighthouse; Mt Lort VHF repeater
4	Bulbous rush	<i>Juncus bulbosus</i>	Mt Roa; Mt Lort
5	Buttercup	<i>Ranunculus repens</i>	Goose/Woodhen Cove
6	Californian thistle	<i>Cirsium arvense</i>	Disappointment Cove
7	Catsear	<i>Hypochoeris radicata</i>	North Plateau Biv
8	Chickweed	<i>Stellaria media</i>	Goose/Woodhen Cove
9	Cleavers	<i>Galium aparine</i>	Goose/Woodhen Cove
10	Cocksfoot	<i>Dactylis glomerata</i>	Basin Biv
11	Creeping bent	<i>Agrostis stolonifera</i>	Goose/Woodhen Cove; North Plateau Biv; North-west Biv; North Five-Fingers Biv; Mt Clerke Biv; North Phillips Biv
12	Crested dogs tail	<i>Cynosurus cristatus</i>	South Five-Fingers Biv
13	Gorse	<i>Ulex europaeus</i>	Disappointment Cove; Goose/Woodhen Cove; Acheron Passage
14	Hawksbeard	<i>Crepis capillaris</i>	Goose/Woodhen Cove
15	Jointed rush	<i>Juncus articulatus</i>	Mt Roa; Mt Lort; Basin Biv
16	Marsh bedstraw	<i>Galium palustre</i>	Disappointment Cove
17	Mouse-eared chickweed	<i>Cerastium fontanum</i>	North coast forests; Disappointment Cove; Goose/Woodhen Cove; Five-Fingers Peninsula; North-west Biv
18	Perennial ryegrass	<i>Lolium perenne</i>	Goose/Woodhen Cove; Centre Biv
19	Prickly puha	<i>Sonchus asper</i>	North coast forests
20	Procumbent pearlwort	<i>Sagina procumbens</i>	North coast forests, Disappointment Cove, Five-Fingers Peninsula, Goose/Woodhen Cove
21	Scotch thistle	<i>Cirsium vulgare</i>	North coast forests, Disappointment Cove, Five-Fingers Peninsula, Goose/Woodhen Cove
22	Smooth meadow grass	<i>Poa pratensis</i>	Goose/Woodhen Cove
23	Soft rush	<i>Juncus effusus</i>	North-west Biv; Centre Biv
24	Sow thistle	<i>Sonchus oleraceus</i>	North coast forests, Disappointment Cove, Five-Fingers Peninsula
25	Sweet vernal	<i>Anthoxanthum odoratum</i>	Disappointment Cove, Goose/Woodhen Cove
26	Tall fescue	<i>Festuca arundinacea</i>	Basin Biv

27	Toad rush	<i>Juncus bufonius</i>	Disappointment Cove, North-west Biv; North Phillips Biv; Basin Biv
28	Turf speedwell	<i>Veronica serpyllifolia</i>	North Plateau Biv
29	White clover	<i>Trifolium repens</i>	Disappointment Cove, Goose/Woodhen Cove
30	Yorkshire fog	<i>Holcus lanatus</i>	Disappointment Cove, Goose/Woodhen Cove, Duck Cove Biv, North-west Biv; Centre Biv

Plant identification pictures and brief descriptions of these weeds are found in a separate document stored on the Te Anau Area Office S:\Biodiversity_Team\Biodiversity - Conservancy Monitoring Team\Resolution Island\Weeds (Resolution Island weed strategy Appendix 8 current known weeds)

Map 1. Weed Surveillance Sites on Resolution Island.



5. Quarantine

Quarantine is the essential first step for controlling the spread of weeds to Resolution Island. It is also the most cost-effective approach. A clear need for more vigilant quarantine measures has already been demonstrated with new weed sites being recorded in locations associated with the recently established track and bivvy infrastructure.

All visitors (DOC, concessionaires, Met-service, recreational etc.) should be reminded of the need for vigilance to prevent weeds or pests being transported to the Island. All DOC trips should have their gear checked as per the Southland Conservancy Island Quarantine Procedures. The Te Anau Area Programme Manager - Biodiversity (or their delegate) is responsible for ensuring these inspections are undertaken.

Note: quarantine inspection must include checks and cleaning for didymo. See Appendix 1 and 2 for quarantine checklists.

6. Surveillance and monitoring

Weed surveillance and monitoring on Resolution Island should be concentrated around known weed locations and infrastructure sites. Priority should be given to sites of human disturbance and visitation e.g. bivvys, newly cut tracks, helipads, boat landing sites, deer pens, repeater sites, or areas where additional infrastructure has been established.

6.1 Surveillance:

Surveillance is the searching for, and documenting of, new weed incursions and the expansion in range of existing weeds on the Island. Effective surveillance means new weeds are located at a stage when eradication or containment is still possible.

All new plant species observed on the Island are significant and should be recorded and reported immediately following each field trip. New weed sites should be recorded on the weed surveillance form (Appendix 3) and most importantly, a GPS location taken to allow efficient follow-up. Appendix 7 provides a guide for actions required when new weed sites are discovered.

Surveillance methods for Resolution Island are outlined below:

Fortuitous surveillance:

Fortuitous surveillance is the detection of new weed incursions during the course of other work.

- Request staff to check bivvy and other sites where they are working and report on and/or remove weed species.
- Provide weed identification information in all bivvys.
- Encourage weed sightings by loading the known weed GPS points into workers GPS units.
- Systematically record new weed sightings.
- Follow up control work regularly.

Workers should also be aware that weeds may arrive on the Island via natural means – either wind-blown or by sea – and should therefore keep an eye-out when visiting the coastal beach margins or disturbed sites such as slips.

Active Surveillance:

This involves the systematic checking of an area for new weed incursions as part of a planned programme of work. Due to its remote location, any planned surveillance on Resolution Island should be done in conjunction with control work, so any weed sites can be dealt with at the time. Priority sites for surveillance are around any infrastructure e.g. bivvy areas, newly cut tracks,

helipads, boat landing sites, deer pens, repeater sites etc. The main infrastructure sites are shown on Map 1.

Active surveillance and control on Resolution Island should become part of the annual Fiordland coastal weeds work undertaken by Te Anau Area biodiversity threats staff using the MV Southern Winds for coastal sites and helicopter for access to inland sites.

Table 2: Surveillance weeds that have not yet been recorded but are likely invaders on Resolution Island

	COMMON NAME	SCIENTIFIC NAME
1	Blackberry	<i>Rubus fruticosus</i>
2	Broad-leaved plantain	<i>Plantago major</i>
3	Broom	<i>Cytisus scoparius</i>
4	Didymo	<i>Didymosphenia geminata</i>
5	Heath rush	<i>Juncus squarrosus</i>
6	Mouse eared hawkweed	<i>Hieracium lepidulum</i>
7	Path rush	<i>Juncus tenuis</i>
8	Ragwort	<i>Senecio jacobaea</i>
9	Tail seeded rush	<i>Juncus canadensis</i>
10	Tussock hawkweed	<i>Hieracium pilosella</i>
11	Vulpia grasses	<i>Vulpia</i> spp.

Identification pictures and brief descriptions of these plants are found in a separate document stored on the Te Anau Area Office S:\Biodiversity_Team\Biodiversity - Conservancy Monitoring Team\Resolution Island\Weeds (Resolution Island weed strategy Appendix 9 surveillance weeds).

6.2 Monitoring:

There is little need for formal monitoring (such as photo-points or abundance plots) of the weed sites on Resolution Island but surveillance and control measures should be assessed periodically (e.g. annually) to make sure progress is being made in reducing weed incursions and local abundance. By keeping accurate surveillance and control records (i.e. completing the weed surveillance and control forms in Appendix 3 and 4) and using the same observers as much as possible this process should be straight forward.

7. Control

The terminology below is used for the different levels of control:

- ERADICATION: permanent removal of all individuals from an area.
- CONTAINMENT: ongoing control to prevent a species spreading beyond a defined distribution.

7.1 Priorities:

High use and vulnerable sites

The sites of greatest concern for weed invasion are those with recently established new infrastructure. Mt Roa, Mt Wales, Mt Clerke and North Phillips bivvys and the Mt Lort VHF repeater site are particularly vulnerable in the alpine zones. Centre Biv, North and South 5-Fingers Bivs, Northwest Biv, and Plateau Biv are in forest locations and Basin and Duck Cove bivvys are on the coast. Around all of these sites recent human activity has created disturbance that could allow weeds to take hold. The goal at these sites should be **eradication as soon as possible**. The longer weeds are present at new sites, the more seed will enter the soil and be further distributed. A policy of eradication of weeds at these sites will prevent new exotic species becoming established on Resolution Island.

Containment sites.

Well established pasture-type weeds (grasses and herbs) are present at the historical coastal landing areas of Disappointment Cove and Goose/Woodhen Cove (where new bivvys have also been established). The goal of weed management at these sites should be containment of existing weeds, with eradication of any weeds spreading beyond these areas (i.e. up tracks, in creek beds, along the coast etc). The exception to this is gorse (*Ulex europeaus*) which should continue to be actively controlled due to its propensity to spread and smother native vegetation. Where possible, any new exotic species should also be eradicated in these areas.

The ideal time to control weeds is in late spring, when flowers are available for identification of plants but before any seed has been set. Advice on control techniques and chemicals should be sought from Ranger-Threats (Plant pests) in Te Anau or TSO Threats (Plant pests) in Southland Conservancy. All weed management on Resolution Island must be approved by the Te Anau Area Programme Manager - Biodiversity.

Weed control forms (Appendix 4) need to be filled out for all weed control done on the Island and the appropriate details entered into the Fiordland Coast Weed Histories spreadsheet (DOCDM-51626). All weed sites should be recorded using GPS.

Options for weed control are as follows:

- **Fortuitous control by workers on the island:** if a weed is positively identified and time is available then hand pulling is a good option. The weed should be carefully removed ensuring all roots and seeds are collected, put in a plastic bag and removed from the Island. A sample of the weed and a completed 'Weed Control Form' (Appendix 4) should be returned to the Te Anau Area Team Leader – Ecosystem Restoration and Protection.
- **Fortuitous weed control and surveillance trips:** one or two experienced weed identification and control workers visit the island utilising any spare helicopter space (e.g. Met-service flights, deer pen checks, repeater repairs etc.) to do surveillance and control.
- **Planned weed control and surveillance trips:** Resolution Island should become part of the annual Fiordland coastal weeds surveillance and control trip organised by the Te Anau Area Ranger Threats (Plant Pests). Priority inland sites (such as bivvys) are checked by helicopter and accessible priority coastal sites are checked by boat.

8. Data collection and storage

Good record keeping is fundamental to an effective weed control programme. The Te Anau Area Programme Manager - Biodiversity (or their delegate) is responsible for:

- filing all surveillance and control sheets from field workers
- updating the Fiordland Coast Weed Histories spreadsheet (DOCDM-51626)
- maintaining an up-to-date file of GPS waypoints for weed locations
- ensuring weed samples are correctly identified

GPS way points are stored on the Te Anau shared computer drive as below:

S:\Biodiversity_Team\Biodiversity - Conservancy Monitoring Team\Fiordland coast weeds\Master (ALL years) Fiordland coast weeds

S:\Biodiversity_Team\Biodiversity - Threats Weeds\GPS Data (Original)\Coastal GPS\ Master (ALL years) Fiordland coast weeds

All new reports of weeds on Resolution Island from field staff, other staff or the public must be recorded on either the Weed Surveillance or Weed Control Sheets (see Appendix 3 and 4) which should then be filed in the Resolution Island filing cabinet in Te Anau. These hard copy records should then be entered into DOCDM-51626. Weed locations should be recorded in the waypoint file on the S: drive (as above).

The Te Anau Area Programme Manager - Biodiversity is responsible for all aspects of weed management on Resolution Island and for the implementation of this strategy and its recommendations. Richard Ewans Ranger Biodiversity (Monitoring) is currently delegated as gate-keeper to enter all the Resolution Island weed reports into electronic form.

9. Recommendations

- Prevent the introduction of new weeds to the Island and the spread of existing weeds by ensuring effective quarantine measures are maintained.
- Continue regular weed surveillance at priority one sites. Work to control and eradicate all weeds at these or any new sites.
- Continue to monitor priority two containment sites to prevent spread of existing weeds and to eradicate any new weed species.
- Regularly update data in the Fiordland Coastal Weed Histories spreadsheet (DOCDM-51626) and GPS data on the Te Anau S: drive.
- Encourage opportunistic checking of all deer pen sites for presence of weeds.
- Ensure that all DOC staff, volunteers, and contractors undertaking work on Resolution Island have been made aware of the Resolution Island Weed Management Strategy and have received the relevant briefing in respect to weeds on the Island.
- Ensure that weed identification kits and surveillance forms are available at each hut/bivvy site and to regular visitors to the Island.
- Encourage all DOC staff, volunteers and contractors undertaking work on Resolution Island to fill in the forms and return to the Te Anau Area Programme Manager - Biodiversity.
- Develop means of educating other visitors not covered in this plan to the risk of introducing or spreading weeds on Resolution Island.

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www.biosecurity.govt.nz/didymo

Appendix 1. Quarantine check list for island travel (from Southland Conservancy Island Biosecurity Plan)

- DOCDM-60768 - Te Anau - Quarantine Self Audit Sheet
- Complete relevant sections on both pages of this form.
- Please check & clean your clothing & equipment before arriving at the quarantine store.
- Note: Any clothing and equipment that has been in contact with birds (especially aviary birds, waterfowl, poultry) and/or reptiles must be disinfected with Trigene™ or Virkon™.

Appendix 2. Didymo guidelines

DIDYMO QUESTIONS for island travel

Section Three (Island Biosecurity and quarantine checklist)	Yes	No
Have you been in contact with any waterways that may have contained Didymo recently?		
Is there a chance that any of your clothing and/or equipment may be contaminated with Didymo?		

If you answered yes to either of the above questions, then we will need to ensure that any contaminated equipment has been adequately cleaned.

Didymo quarantine guidelines:

To ensure you do not spread Didymo or other aquatic pests, wherever possible restrict equipment, boats, clothing and other items for exclusive use in a single waterway.

Fish, plants, rocks and other river items should not be moved between waterways.

To ensure you do not spread Didymo, if you are moving between waterways, you must clean items using the following methods:

1. **CHECK:** Before you leave a river or lake, check items and leave debris at site. If you find any later, treat and put in rubbish. **Do not wash down drains.**
2. **CLEAN:** There are several ways to kill Didymo. Choose the most practical treatment for your situation which will not adversely affect your gear.
3. **DRY:** Drying will kill Didymo, but slightly moist Didymo can survive for months. To ensure Didymo cells are dead by drying, the item must be **completely dry** to the touch, inside and out, then left dry for at least another 48 hours before use.

Cleaning:

1. Non-Absorbent items

Detergent: soak or spray all surfaces for at least one minute in 5% dishwashing detergent or nappy cleaner (two large cups or 500mls with water added to make 10 litres);

OR

Bleach: soak or spray all surfaces for at least one minute in 2% household bleach (one small cup or 200mls with water added to make 10 litres);

OR

Hot water: soak for at least one minute in very hot water **kept above** 60 °C (hotter than most tap water) or for at least 20 minutes in hot water **kept above** 45 °C (uncomfortable to touch).

2. Absorbent items

These require longer soaking times to allow thorough saturation. For example, **felt-soled waders**

Hot water: soak for at least 40 minutes in hot water kept above 45 °C;

OR

Hot water plus detergent: soak for 30 minutes in hot water kept above 45 °C containing 5% dishwashing detergent or nappy cleaner;

OR

Freezing any item until solid will also kill Didymo.

If cleaning or drying is not practical, restrict equipment to a single waterway.

NOTE: The thicker and denser the material

- the better it will be at holding moisture (and live cells)
- the slower it will be to dry out
- the more difficult it will be to soak completely with cleaning solutions.

When cleaning equipment, we recommend that you:

- Soak porous materials for longer than the specified decontamination times to ensure cleaning solution has soaked right through the item before soaking for the required decontamination time
- Choose a decontamination solution that will not adversely affect your equipment
- Follow manufacturer's safety instructions when using products
- Dispose of cleaning waste well away from waterways

When applying the above cleaning methods, we recommend that you:

- Use biodegradable products
- Do not wash cleaning waste into waterways
- Choose a cleaning solution from the above choices that will not adversely effect your equipment

If you require more information please visit: www.biosecurity.govt.nz/didymo

To report a suspected find of Didymo please call 0800 80 99 66

Appendix 3. Weed surveillance form

Please fill in information for any weeds that are new to the island or for existing weeds new to an area of the island. Remember all introduced plants are of interest. GPS LOCATIONS ARE REQUIRED.

Your reference on map	Common name	Scientific name	Area of coverage (m/ha/# of plants)	Location (description of site for ease of re-finding)	GPS coordinates		Seedlings/ Flowers/ Fruits	Photo taken Y/N	Date	Veg. type	Comments eg. if specimen taken, if plant removed.
					Easting	Northing					

GUIDELINES

Record all introduced plants found outside of areas already shown on map. Take a specimen sample if you are unsure of the species or if you control the plant.

Your reference on map: The number/letter you have put on the map that refers to the specific entry for that introduced plant

Area of coverage (m/ha/# of plants): Measure or count of the number of plants. Where appropriate include a density measurement.

Location: Description on the ground of where the plant is. Be specific so that this location can be re-visited.

GPS coordinates: Full 7 digit easting and northing.

Seedlings/Flowers/Fruits: Write whether the plant has seeds, flowers, fruits or the remains of any.

Photo taken Y/N: Write 'yes' or 'no' as to whether a photo of the plant and the site was taken. If 'yes' include the photo with this form.

Veg type: eg. Boulderfield, Cushionfield, Grassland, Forest, Herbfield, Lichenfield, Loamfield/Peatfield, Mossfield, Pasture, Rockland, Sandfield, Scrub, Sedgeland, Shrubland.

Specimen taken : Write 'yes' or 'no' as to whether a specimen of the plant was taken. Refer to appendix 5 how to collect specimens

Please return this form to the Department of Conservation Te Anau Area Office: Te Anau Area Islands Supervisor.

Appendix 4. Weed control form

Please fill out this form for all weed control undertaken.

GUIDELINES

GPS coordinates: Record 7 digit readings for eastings and northings

Vegetation class: eg. Boulderfield, Cushionfield, Grassland, Forest, Herbfield, Lichenfield, Loamfield/Peatfield, Mossfield, Pasture, Rockland, Sandfield, Scrub, Sedgeland, Shrubland, Treeland.

Distribution: eg. Locally scattered, local patches, scattered throughout, patches throughout, common throughout, one small infestation, other (please specify).

Abundance Dominant (76-100%), Abundant (51-75%), Common (26-50%), Frequent (6-25%), Occasional (2-5%), Scarce (1%)

Please return this form to the Department of Conservation Te Anau Area Office: Te Anau Area Islands Supervisor.

Location			
Observer		Date	
Species			
GPS coordinates	Easting		Northing
Vegetation class			
Area occupied by weed			
Distribution			
Abundance			
Number of plants	Adult	Adolescents	Seedlings
Permanently marked? (Y/N and description)			
Photo taken? Y/N			
Control method			
Type and amount of chemical used			
Time spent			
Comments			
Map			
(Back at Office) Date entered into database		By who	

Appendix 5. Collecting and sending specimens for identification

If a suspected weed is unable to be identified confidently in the field then collect a sample for identification using the following guidelines:

It is important to collect good samples and keep them as fresh as possible. Equally if not more important is to GPS the location. If you do nothing else, do these two things! (and then pass it on to the Te Anau Area Islands Supervisor who is responsible for having the sample identified).

If there is only a small quantity of a plant in the field, and you are not sure whether it is native, it is important not to pull it all up or to damage it more than necessary. The following instructions are intended for ideal collections where there is plenty of plant material. If there is not much, collect less of the plant and take more notes and lots of photos.

Collect specimens in plastic bags to keep them as fresh as possible until you are able to process them further. Never leave specimens in plastic bags in direct sunlight, as this will hasten their deterioration.

Taking good notes is very important. Without good notes, an otherwise good specimen can be virtually useless. If you find a weed the 'Weed surveillance' form will need to be completed. If a sample is taken then note this on the form. GPS the site and write the coordinates on the form as well as keeping them in your GPS. Remember: if the plant is a weed somebody may have to go back and control it. Therefore they need to be able to find it.

A photograph is not essential but it can be an excellent supplement to your specimen and notes. Photos are good for giving a better idea of the habitat of the plant and how big the patch is. They are also good for reminding yourself later on. There may also be circumstances where they are all you can get, particularly if there is a very small amount of an unknown plant, or the plant is in a dangerous or inaccessible location. Take separate pictures of the leaves, flowers, fruit and an overall picture of the plant.

Taking a photo is no substitute for collecting a specimen, but it is certainly better to have a photograph than nothing.

COLLECTING DIFFERENT PLANT-TYPES:

Grasses, sedges and rushes:

These are the most likely weeds to be encountered on Resolution Island and are also the riskiest group for new weed incursions. Grasses and other grass-like plants are notoriously difficult to identify unless they have flowers or fruit. Wherever possible collect specimens with flower or seed heads. Collect whole clumps of the plant from the bases of the stems to the leaf tips and flower heads, and if they are too big fold them up carefully.

Herbaceous plants:

Small herbs are also common new invaders and these plants can be collected whole. With larger plants collect flowering and fruiting stems, as well as leafy stems - which may sometimes differ. Try to collect a sample from the base of the stem as well as the tip. Basal leaves of rosette herbs should be collected, even if they have died off as they can be an important diagnostic feature. Where possible collect part of the root system e.g., any rhizomes, stolons or tubers, if this is not possible describe it. Knock off as much soil as possible. Any other special features such as habitat, smell, and flower colour should be noted.

Trees, shrubs and climbers:

Gorse is currently the only known shrubby weed on Resolution Island. There are no known tree or climber plant pests. The risk of new invasions is probably quite low. If a new species is found, collect leaves attached to the stem, preferably with flowers and/or fruit. Rather than just collecting a branch tip, try to collect parts from both the tip and further down the branches. If there are suckers from the base or juvenile leaves these should also be collected, as should a sample of bark wherever possible. Record any other special features such as habit and height of plant, colour of flowers or fragrance.

Ferns:

As with the category above, there are currently no known fern plant pests on Resolution Island and the risk of invasion is probably quite low. It is important that the whole frond is collected, particularly the base. If the fronds are too large they can be folded. Collect fern fronds with spores, or if there are two types of frond collect both sterile and fertile. Fern rhizomes should be collected where possible but this can be destructive, and native and exotic ferns are not easy to distinguish. If in doubt do not collect the rhizome but describe the habit (tufted, creeping, trunk) and collect samples of scales or hairs from the rhizome (which are usually easily removed).

Appendix 6. Key contacts

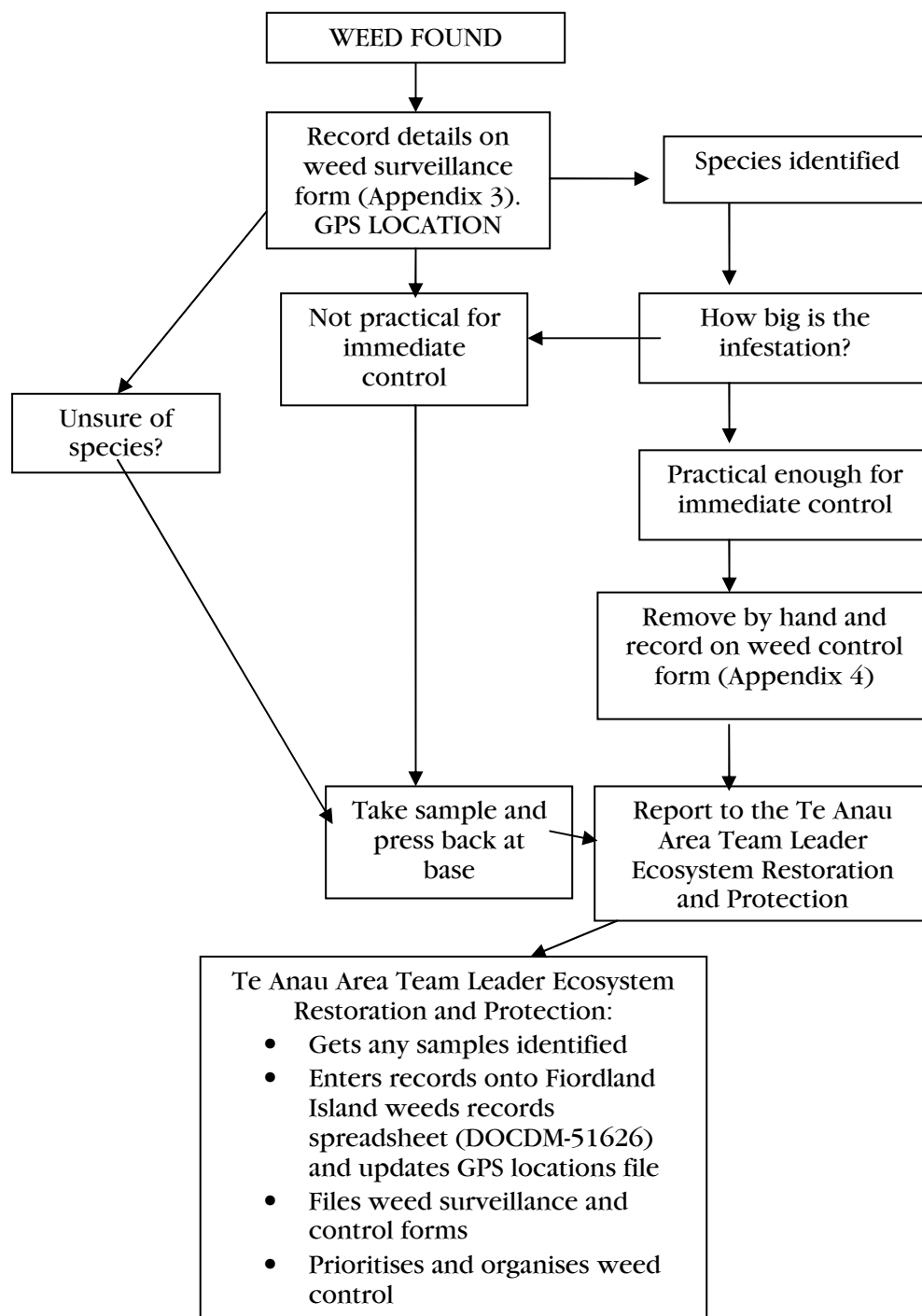
The primary contact for all weed management on Secretary Island is the Te Anau Area Islands Supervisor. Only if they are unavailable should other staff listed in the table below be contacted.

TITLE	OFFICE	NAME
Te Anau Area Team Leader Ecosystem Protection and Restoration	TA	Norm MacDonald
Programme Manager-Biodiversity	TA	Lindsay Wilson
Ranger-Islands	TA	Kerri-Anne Edge
Ranger-Islands	TA	Pete McMurtrie
Technical Advisor -Threats	SC	Lynne Huggins
Ranger-Threats (Plant pests)	TA	Alastair Hay
Ranger-Biodiversity (monitoring)	TA	Richard Ewans/Sue Lake

TA=Department of Conservation Te Anau Area Office, Lakefront Drive, Te Anau (032490200).

SC=Department of Conservation Southland Conservancy, Level 7 CUE on Don, 33 Don Street, Invercargill (032112400).

Appendix 7. Decision tree for weed sightings on Resolution Island



Appendix 8. Exotic plant species that have been recorded on Resolution Island (as at September 2010).

The plant identification pictures for this appendix are stored as a separate document in S:\Biodiversity_Team\Biodiversity - Conservancy Monitoring Team\Resolution Island\Weeds

	COMMON NAME	SCIENTIFIC NAME	LOCATION OF WEEDS
1	Annual poa	<i>Poa annua</i>	Goose/Woodhen Cove; North-west Biv; South Five-Fingers Biv; Centre Biv
2	Birdsfoot trefoil	<i>Lotus pendunculatus</i>	Goose/Woodhen Cove
3	Browntop	<i>Agrostis capillaris</i>	Five-Fingers lighthouse; Mt Lort VHF repeater
4	Bulbous rush	<i>Juncus bulbosus</i>	Mt Roa; Mt Lort
5	Buttercup	<i>Ranunculus repens</i>	Goose/Woodhen Cove
6	Californian thistle	<i>Cirsium arvense</i>	Disappointment Cove
7	Catsear	<i>Hypochoeris radicata</i>	North Plateau Biv
8	Chickweed	<i>Stellaria media</i>	Goose/Woodhen Cove
9	Cleavers	<i>Galium aparine</i>	Goose/Woodhen Cove
10	Cocksfoot	<i>Dactylis glomerata</i>	Basin Biv
11	Creeping bent	<i>Agrostis stolonifera</i>	Goose/Woodhen Cove; North Plateau Biv; North-west Biv; North Five-Fingers Biv; Mt Clerke Biv; North Phillips Biv
12	Crested dogs tail	<i>Cynosurus cristatus</i>	South Five-Fingers Biv
13	Gorse	<i>Ulex europaeus</i>	Disappointment Cove; Goose/Woodhen Cove; Acheron Passage
14	Hawksbeard	<i>Crepis capillaris</i>	Goose/Woodhen Cove
15	Jointed rush	<i>Juncus articulatus</i>	Mt Roa; Mt Lort; Basin Biv
16	Marsh bedstraw	<i>Galium palustre</i>	Disappointment Cove
17	Mouse-eared chickweed	<i>Cerastium fontanum</i>	North coast forests; Disappointment Cove; Goose/Woodhen Cove; Five-Fingers Peninsula; North-west Biv
18	Perennial ryegrass	<i>Lolium perenne</i>	Goose/Woodhen Cove; Centre Biv

19	Prickly puha	<i>Sonchus asper</i>	North coast forests
20	Procumbent pearlwort	<i>Sagina procumbens</i>	North coast forests, Disappointment Cove, Five-Fingers Peninsula, Goose/Woodhen Cove
21	Scotch thistle	<i>Cirsium vulgare</i>	North coast forests, Disappointment Cove, Five-Fingers Peninsula, Goose/Woodhen Cove
22	Smooth meadow grass	<i>Poa pratensis</i>	Goose/Woodhen Cove
23	Soft rush	<i>Juncus effusus</i>	North-west Biv; Centre Biv
24	Sow thistle	<i>Sonchus oleraceus</i>	North coast forests, Disappointment Cove, Five-Fingers Peninsula
25	Sweet vernal	<i>Anthoxanthum odoratum</i>	Disappointment Cove, Goose/Woodhen Cove
26	Tall fescue	<i>Festuca arundinacea</i>	Basin Biv
27	Toad rush	<i>Juncus bufonius</i>	Disappointment Cove, North-west Biv; North Phillips Biv; Basin Biv
28	Turf speedwell	<i>Veronica serpyllifolia</i>	North Plateau Biv
29	White clover	<i>Trifolium repens</i>	Disappointment Cove, Goose/Woodhen Cove
30	Yorkshire fog	<i>Holcus lanatus</i>	Disappointment Cove, Goose/Woodhen Cove, Duck Cove Biv, North-west Biv; Centre Biv

Appendix 9. Surveillance weeds

The following plants are not currently known to be present on Resolution Island, but are possible invaders most likely to be introduced by humans. All have the potential to become established and to have a significant impact on the natural values of the island.

The plant identification pictures for this appendix are stored as a separate document in S:\Biodiversity_Team\Biodiversity - Conservancy Monitoring Team\Resolution Island\Weeds

	COMMON NAME	SCIENTIFIC NAME
1	Blackberry	<i>Rubus fruticosus</i>
2	Broad-leaved plantain	<i>Plantago major</i>
3	Broom	<i>Cytisus scoparius</i>
4	Didymo	<i>Didymosphenia geminata</i>
5	Heath rush	<i>Juncus squarrosus</i>
6	Mouse eared hawkweed	<i>Hieracium lepidulum</i>
7	Path rush	<i>Juncus tenuis</i>
8	Ragwort	<i>Senecio jacobaea</i>
9	Tail seeded rush	<i>Juncus canadensis</i>
10	Tussock hawkweed	<i>Hieracium pilosella</i>
11	Vulpia grasses	<i>Vulpia</i> spp.