2022-23 Stewart Island/Rakiura Dune Restoration Program Report

Context & Program Background

Stewart Island/Rakiura has some of New Zealand's most significant natural dune systems.

Around the 1930s marram grass was introduced to Mason Bay by farmers to stabilise the sand dunes to stop sand spreading to inland areas being prepared for pasture. Marram grass seed and rhizome was gradually spread to other beaches and dunes around the island by wind and ocean currents.

Over time marram grass displaces other dune species and changes the dynamic nature of dunes.

In the 1980s work began on Whenua Hou/Codfish Island to remove marram grass from the dune system there. It was believed the persistence of marram grass would make the dunes unsuitable for South Georgian Diving Petrel (now reclassified as New Zealand Diving Petrel) to burrow.

Around the mid-1980s, Tree Lupin was controlled in the Duck creek/Mason Bay area adjacent to an area of *Gunnera hamiltonii* to protect this rare plant.

After the inception of DOC in 1987, work began by rangers to remove marram from some of the dunes on Mainland Rakiura.

The Dune Restoration Program's goal is to restore Stewart Island/Rakiura's dune systems to a naturally active, dynamic state. This will be achieved by removing exotic/invasive plant pest species from the dune system to enable natural sand movement and deposition, this in turn will allow native and endemic dune plants and animals to re-establish and restore natural ecological processes.

Methods

In large areas of high marram and/or lupin density, Helicopter boom spraying with herbicide is used for the first few seasons.

This method is followed up in subsequent years with ground herbicide applied either spot spraying discrete infestations mechanically from vehicle(Argo) mounted spray unit or for spars, more widely spread infestations using ground/grid searching teams of preferably three to seven people carrying knapsacks of herbicide.

Treatment areas

Dune treatment areas are split into functional groups for business/thirdly reporting purposes.

Mason Bay, the largest of these dune areas is split into Northern and Central areas and divided further into management units for ease of treatment. Each management unit uses natural features like sand ridges and gullies and boundaries and generally take around one to two hours to search by ground/grid searching teams.

Each treatment area is treated only once a year and the Mason Bay Northern and Central areas are treated on alternate years i.e., Northern one year, Central the next...

Data Management

Field data is collected by GPS, either tracking/waypoints on Garmin handheld units for grid search and Argo teams or Helicopter mounted, and spray triggered plotter units when Ariel spraying using Helicopter.

In field data is downloaded to a laptop and transferred to GIS storage and reporting spreadsheets to be later added to the DOCGIS weeds system.

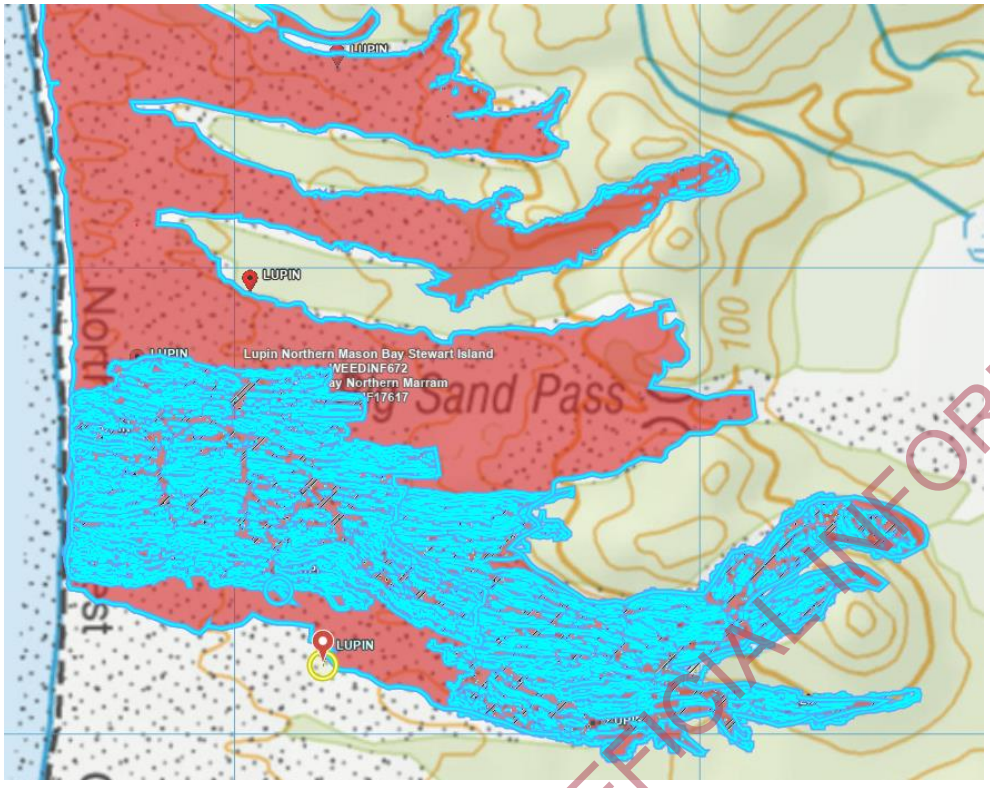
Operational Reporting

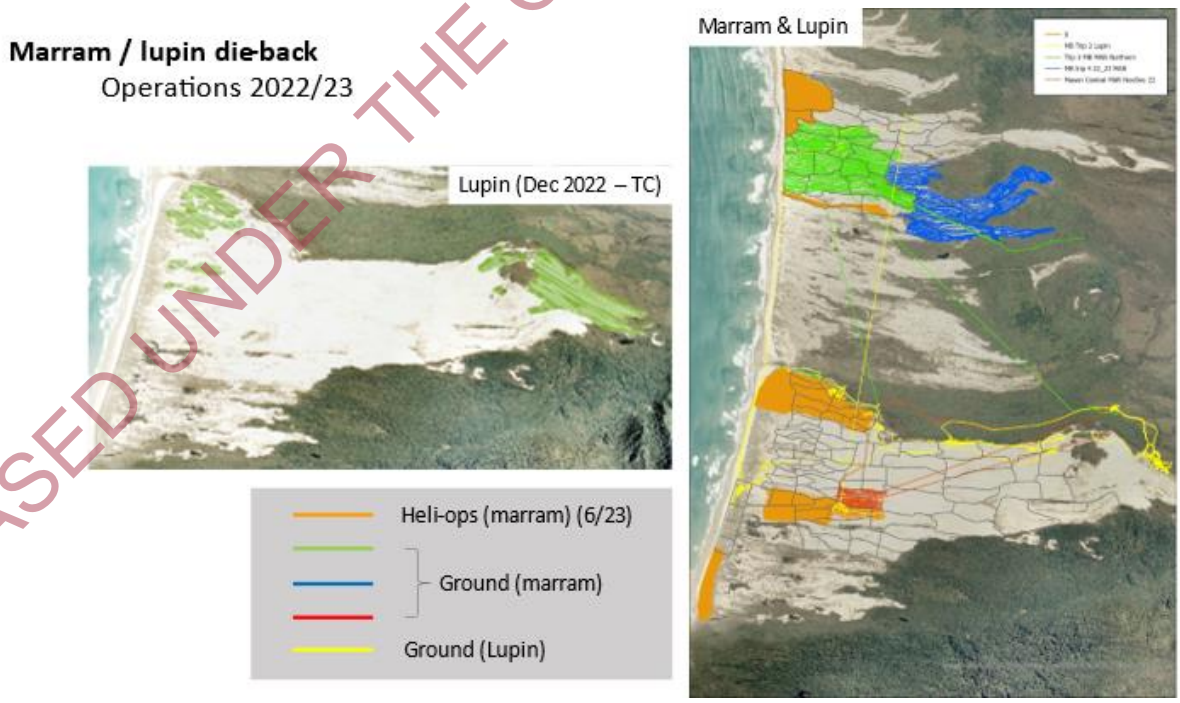
DOCGIS weeds system captures the tracks, waypoints, methods, herbicides used, staff and staff hours for any given financial year and can be used to review and set up future field trips to treat those areas, forecast expected herbicide use.

Annual Results:

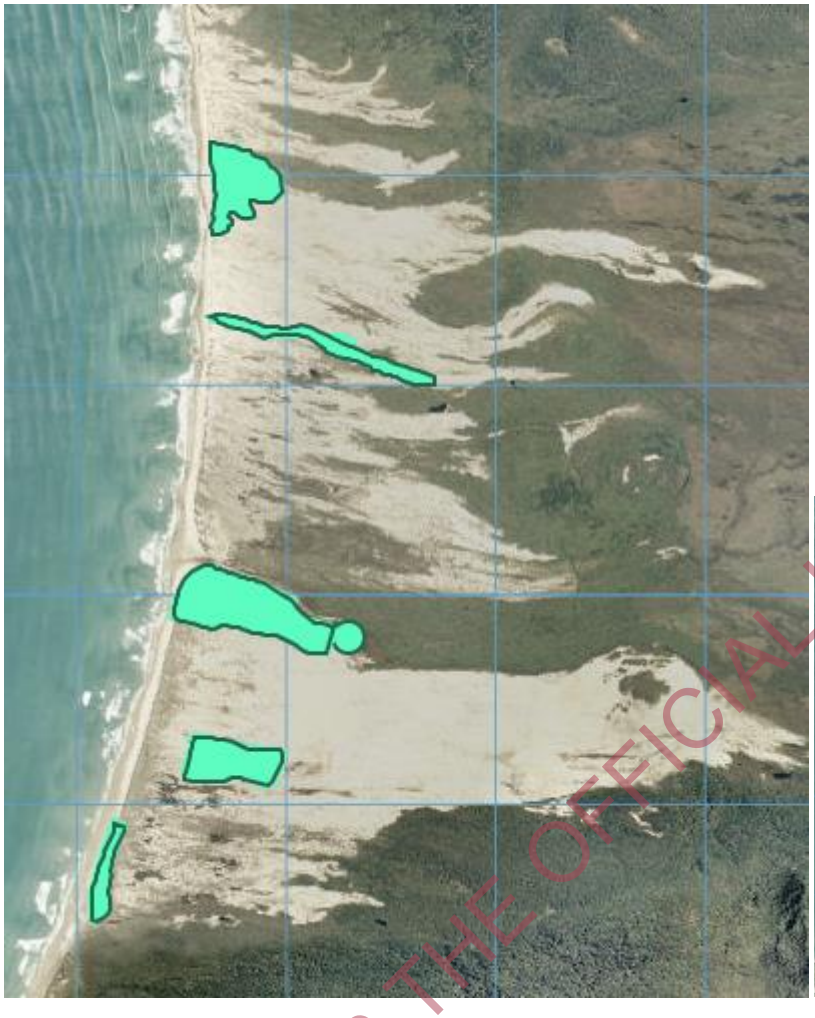
Mason Bay:

- **Mason Bay Northern Marram grid searching/knapsack spraying.**





- **Mason Bay Marram Heli Spraying**



26/05/2022, s9(2)(g)(ii) (DOC)/HeliOps Southland, s9(2)(a) (Pilot), ?(loader), Dry, cool, calm 12-14 deg. C

Q:\GIS_Users\Rakiura\Projects\Biodiversity Programme\Threats Management\Dune Weeds\DUNE_MASON\Heli spray all years\Heli_spray_May_2022

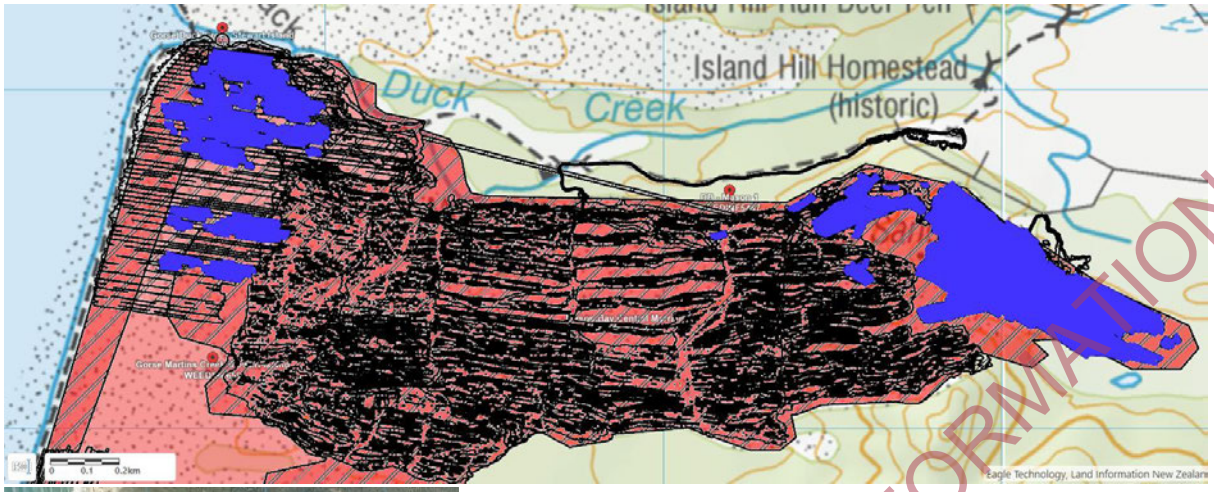
RNPVC – Biodiversity – Coastal weeds daily recording - DOC-5993106

Marram Helicopter Boom Spray, Hurricane: 20,000 litres @ 400L water/ha, 15L/ha Hurricane, 4L Synoil/Peptoil/ha

50ha sprayed

4.4hr spray time ZK-HRK B2 Squirrel Helicopter/$12,650 @ 50ha = $253/ha + Hurricane @ $465/ha

- **Mason Bay Central Lupin Heli spraying (shown in blue)**



13/12/2023 Lupin Helicopter Boom Spray

s9(2)(g)(ii) (DOC)/HeliOps Southland, s9(2)(a) Pilot), ?(loader),

Dry, sunny, calm 14-16 deg. C

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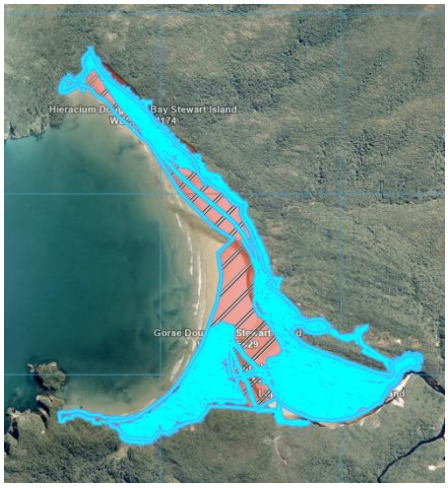
Tordon Brushkiller XT, 8000litres @ 400L water/ha, 2L/ha Tordon, 1L Boost/ha

20ha sprayed @4hrs spray time @ $2750/ha = @$11,000 ($550/ha + $1600/Chem)

Doughboy Bay



2013-14

- 415 litres Gallant, marram
- 380 litres Tordon, gorse
- Heli spray ???

2014-15

- 528 litres Gallant, marram
- 200 litres Hurricane marram
- 215 litres Tordon (Knapsack Gorse)
- 400 litres Tordon (Heli. Gorse)
- 35 litres Tordon (Heiracium)

2015-16

- 461 G, 146 T, 97 T(h)
- 2016-17
- 387 G, 172 T, (h) not sprayed
- 2017-18
- 289 G, 65T

2018-19

- 113 L Gallant/marram
- 71 L Tordon/gorse

2019-20

- 71 L Gallant/marram
- 25 L Tordon/gorse
- 14.5 L Tordon/Hieracium

2020-21

- 142 L Gallant/marram
- 71.5 L Tordon/gorse
- 53 L Tordon/Hieracium

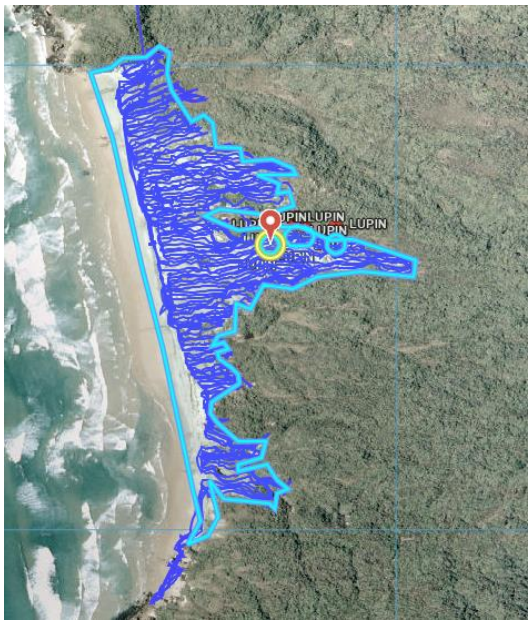
2021-22

- **116.5 L Gallant/marram**
- **60 L Tordon/Gorse**
- **68 L Tordon/Hieracium**

2022-23

- **159.5L Gallant/marram**
- **38.5L Tordon/gorse**

- **Little Hellfire Beach**

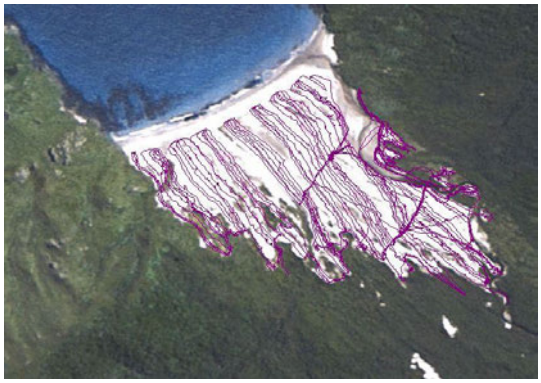


- **2010: 150 litres**
- **2011: 86 litres**
- **2012: 60 litres**
- **2014: 27 litres**
- **2015: 20 litres**
- **2016: 21 litres**
- **2017: 16 litres**
- **2018: 15 litres**
- **2019: 15 litres marram, 28 litres Hieracium**
- **2020: 3 litres marram,12 litres Hieracium**
- **2021 & 2022 not visited**
- **2022-23: 26 litres, 10ml cut n paste lupin**

Big Hellfire

- **2011: 10L**
- **2012: 0L**
- **2015: 3L**
- **2018: No marram found**
- **2019: Not visited**
- **2021: 5L**
- **2022: Not visited**
- **2022-23: 1.5L**

- **East & West Ruggedy**



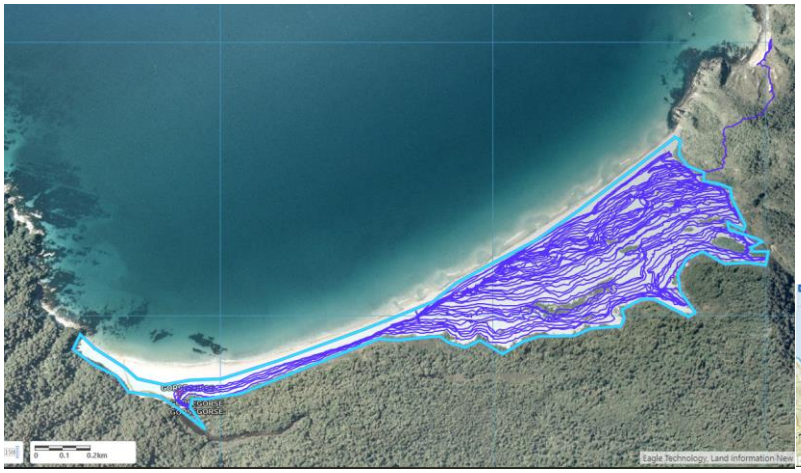
East Ruggedy

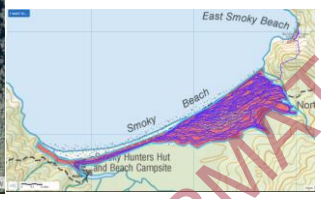
- **2014: 70 litres**
- **2015: 165 litres**
- **2016: 73.5 litres**
- **2017: 55 litres**
- **2018: 56 litres**
- **2019-20: 28 L marram, 26 L Hieracium**
- **2020-21: 21 litres marram, 1 litre gorse**
- **2021-22: Not visited**
- **2022-23: 130 litres marram, 5 litres gorse**

- **West Ruggedy**

- **2015: 55L**
- **2016: 59.5L**
- **2017: 10L**
- **2018: 13L**
- **2019-20: 3L marram, 13L Hieracium**
- **2020-21: 18 L marram, 11L Hieracium**
- **2021-22: Not visited**
- **2022-23: 25.5 litres marram**

Smoky Beach Grid Search





- **2014 – 150 litres**
- **2015 – 35 litres**
- **2016 – 20 litres**
- **2017 – 11 litres**
- **2018 – 13 litres**
- **2019 – not visited**
- **2020 – not recorded**
- **2021 – spray amount not recorded**
- **2022 – not visited**
- **2022-23: 31 litres marram, 1 litre gorse**

East Smoky

- **2016: 300 litres**
- **2017: 260 litres**
- **2018: 70 litres**
- **2019-20: 3.5 litres**
- **2020-21: not visited**
- **2021-22: not visited**
- **2022-23: 5 litres**

Murray Beach

- **2010: 315 litres**
- **2011: 125 litres**
- **2016: 13 litres**
- **2017: 9 litres**
- **2018: 13 litres**
- **2019-20: not sprayed**
- **2020-21: 5 litres**
- **2021-22: 7 litres**
- **2022-23: Not visited**

Bungaree Beaches

Big Bungaree:

- **2015: 1 litre**
- **2017: 4 litres**
- **2018: 1 litre**
- **2019-20: not sprayed**
- **2021-22: 5ml marram,**
- **2022-23: Not visited**

Little Bungaree:

- **2015: 6 litres**
- **2017: 0.5 litre**
- **2017: 1 litre Tordon (Hieracium)**
- **2018: 3 litres**
- **2019-20: not sprayed**
- **2021-22: 8 litres Hieracium**
- **2022-23: Not visited**

- **Port Adventure & Tikotatahi**

- **2015: 30 litres**
- **2017: 17 litres**
- **2019-20: 30 litres**
- **2020-21; not visited**
- **2021-22: 2 litres**
- **2022-23: Not visited**

Easy Harbour

- **2014-15: 600 litres**
- **2015-16: 500 litres**
- **2016-17: 310 litres**
- **2017-18: 360 litres**
- **2018-19: 140 litres**
- **2019-20: 30 litres**
- **2020-21: Not visited**
- **2021-22: 20 litres**
- **2022-23: 15 litres**

Maori Beach

- **2015 Knapsack sprayed 50 litres Gallant**
- **2016-17 knapsack sprayed 10 litres of Gallant**
- **Sprayed Montbretia 300 litres "Associate 600 WDG & Li 1000"**
- **2018: 10 litres Gallant**
- **2019-20: 7 litres Gallant**
- **2020-21: 16 litres Gallant, Cut n paste Honey suckle & cotoneaster**
- **2021-22: 9 litres Gallant**
- **2022-23: less than 15 litres?**

Discussion

The 2022-23 dunes season was late starting and short staffed.

The first Mason Bay field trip started a month late on the 28th November with only three staff. The following trip had four staff members and the third and final trip was variable with between two and five staff coming and going.

Kilbride gorse was not treated as planned in the 2022-23 season

Past seasons have seen two permanent, two casual and two volunteer staff for four to five nine-day trips equalling around 216 to 270 staff days.

The total number of staff days for 2022-23 season was only 98.

This explains why only around half the area usually grid searched has been covered.

Ulva Island incursion response impacted the availability of staff this season.

Capacity has been built in the bio team in the form of a fixed term Ulva Island ranger.

There appeared to be extremely vigorous marram and lupin growth this season, this may be from a combination of two successive hot, dry and sunny summers and the release of seed and sand/nutrients from the increasingly active foredune area.

Strategic Heli spraying was carried out to suppress lupin and marram growth in the more active areas.

Recommendations

- Ensure regular/consistent staffing and timely recruitment for this program of work.
- Ensure regular, well-staffed dunes field trips throughout the season covering all areas.
- Continue to actively monitor and react to flushes of weed species growth in the dunes.
- Continue strategic heli spraying of marram and lupin when required to suppress growth and spread.
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