

# MONTAGUE ISLAND

## SEABIRD HABITAT RESTORATION PROJECT

### CASE STUDY of an Environmental Trust Project on Montague Island Nature Reserve 2004-2007

#### OVERVIEW of the Project

The NSW National Parks and Wildlife Service (NPWS) embarked on a unique and ambitious seabird restoration program in 2004 on Montague Island, one of the most significant offshore seabird islands in NSW. Montague Island is located off Narooma on the NSW Far South Coast.

The program aimed to remove Kikuyu Grass, an exotic pastoral grass, which was smothering native vegetation.

This expanding Kikuyu Grass monoculture was resulting in the loss of large expanses of seabird breeding habitat.

Charles Sturt University research identified that the most

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suitable method of Kikuyu Grass control was the use of an integrated control program that included combinations of herbicidal spraying, burning of the thick

Kikuyu Grass biomass and revegetation using native plant species.

This incredibly successful program has to date removed over 14.5 hectares of Kikuyu Grass from Montague Island and has halved its distribution.

In its place over 60,000 native seedlings have been planted to reduce any risk of reinfestation and also provide suitable habitat for nesting seabird species, such as the Little Penguin.

The extensive revegetation works have been successfully achieved through a cooperative effort involving National Parks and Wildlife Service staff, Charles Sturt University undergraduate students and tourists participating in eco tours conducted on Montague Island.

Program participants have made a significant contribution to the restoration of Montague Island's seabird habitat through their assistance with the extensive planting operations.



#### MONTAGUE ISLAND KIKUYU DISTRIBUTION (green areas)

2001



2001



*Kikuyu dominant, over 1m deep.*



2004



*Sprayed, burnt, ready for planting*



2005



2005



*Native vegetation established*



## PROCESSES Involved in the Project

### History and spread of Kikuyu Grass on Montague Island

Initial research conducted in the 1990s by Charles Sturt University and CSIRO researchers identified that Kikuyu Grass, introduced to the island in the mid 1900s, was spreading at a rapid rate throughout seabird habitat on Montague Island.

In 2000, Kikuyu Grass covered over 45% (22.6 hectares) of Montague Island, with most of the spread occurring across the southern half of the island throughout the moist gully lines and along mown access tracks. However, isolated patches also appeared within inaccessible and remote areas of the island, possibly spread by seed or stems transported by wind or runoff.

Large areas of previously native vegetation became Kikuyu Grass monocultures and with time, increased in thickness to form a dense Kikuyu Grass mat (over a metre in some areas) subsequently reducing Little Penguin access to breeding habitat.

This led to large areas of potential seabird breeding habitat, previously utilised by nesting Little Penguins as well as by burrowing Short-tailed, Wedge-tailed and Sooty Shearwaters, becoming disused. In addition, seabirds which did nest within the Kikuyu Grass were at risk of becoming entangled within the grass's thick stems.

Alarmingly, based on the historic rapid rate of Kikuyu Grass spread (over 1 hectare per year), if no intervention was undertaken Kikuyu Grass would have potentially spread across the entire vegetated area of the south island within 12 years (Montague Island is divided by a steep ravine, which effectively creates two islands, 'north' and 'south' joined by a rocky beach).

### Kikuyu Grass control research

In 2001, the National Parks and Wildlife Service, (the management authority for Montague Island), aware of the increasing spread of Kikuyu Grass and the need to protect seabird habitat sought the help of Charles Sturt University (CSU) researchers to investigate possible methods of Kikuyu Grass control.

Various methods of control were trialled within experimental plots, these included combinations of burning, herbicidal spraying using Roundup® (glyphosate), shading with fast growing native plants, and revegetation (with native plant species).



ZONE 1 - after spraying - May 2004

These experimental plots were monitored prior to, and for up to four years following treatment, to determine the extent of Kikuyu Grass control (i.e. reduction in cover and height) and the associated vegetation changes.

In addition to the trial plots an integrated Kikuyu Grass control method was trialled across a larger area, which enabled a further opportunity to research Kikuyu Grass control at the broad-scale,

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The results of this Kikuyu Grass control identified that an integrated method of spraying, burning and revegetation was the most effective and suitable control method for use on Montague Island.

Spraying was the only method which killed the Kikuyu Grass systemically, including the extensive root system of the species that could extend well beneath the soil (incredibly up to 3 metres).

Burning of the previously sprayed Kikuyu Grass removed the thick biomass mat and hence removed the threat of seabird entanglement.



ZONE 1 - Burn phase - June 2004

Revegetation ensured that native plant species conducive to seabird nesting (such as Mat-rush *Lomandra longifolia*) were re-introduced to the treated habitat.

Broad-scale monitoring identified that this integrated control method must be accompanied by annual follow-up spraying of Kikuyu Grass regrowth to ensure effective control levels were maintained in the long term.



## CREATION AND IMPLEMENTATION of the Seabird Habitat Restoration Project

In 2004, in response to the initial results within both the experimental plots and the larger revegetated zone (monitored by CSU), NPWS formulated the Seabird Habitat Restoration Program (SHRP).

The central aim of this unique ongoing program is to control and reduce the distribution of Kikuyu Grass across Montague Island, whilst simultaneously restoring native seabird breeding habitat.

A strategic Kikuyu Grass control plan was formulated which divided Montague Island into a number of 'zones'. The boundary of each zone was based on the density and accessibility for treatment of Kikuyu Grass present.

On the south-western side of the south island, dense patches of easily accessible Kikuyu Grass (i.e. adjacent to vehicle access tracks) were divided into small (1-ha) zones.

These heavily infested zones were subjected to intensive control methods (i.e. the successful combination of burning, spraying and revegetation previously trialled by CSU researchers). Only one small zone was to be treated annually, due to financial and logistical constraints.

The central portion of the south island surrounding the Lighthouse and residence quarters was zoned as the light station precinct. The remaining areas of Montague Island (i.e. the entire north island and eastern side of the south island) were combined into a single zone as it was largely inaccessible and could not be treated using intensive control methods. The isolated patches of Kikuyu Grass within this zone were controlled by aerial spraying by helicopter. This method involved selective herbicide spraying of Kikuyu Grass via a specialised trigger activated hose.

Aerial spraying was undertaken initially in August (winter) 2004 and then as required to control any Kikuyu Grass regrowth.



ZONE 1 - post burn - June 2004

The majority of the more intensive, integrated Kikuyu Grass control zones identified in the SHRP are within the nesting distribution of the Little Penguin on Montague Island. This seabird species relies heavily on a dense cover of native vegetation beneath which to nest and moult.

Native vegetation cover, predominantly Matt-rush, permits Little Penguin access between shrubs whilst providing a dense network of radiating leaves under which to nest. Kikuyu Grass however grows into a thick mass making access difficult for Little Penguins.

In order to ensure suitable nest sites were available within recently treated zones, nest boxes were provided as an interim measure until the native vegetation cover increased.

**"In 2000, Kikuyu Grass covered over 45% (22.6 hectares) of Montague Island"**

## RESULTS & OUTCOMES - now and in the future

The SHRP has proved highly successful in controlling and reducing the spread of Kikuyu Grass, whilst simultaneously restoring degraded seabird habitat on Montague Island.

Integrated control in conjunction with aerial spraying has more than halved the distribution of Kikuyu Grass found prior to the implementation of the program (i.e.

approximately 22.6 hectares in 2000; 8.5 hectares in 2008).

To date, five zones have been treated with intensive control methods (spraying, burning and revegetation) on the south western side of the island. In addition, over 60,000 native seedlings have been planted as part of revegetation works undertaken within these five zones.

Aerial spraying has proved a highly effective means of controlling

inaccessible patches of Kikuyu Grass on Montague Island, with Kikuyu Grass found across only 5% of the aerially sprayed zone one year after treatment. Follow-up aerial spraying was undertaken in winter 2008 to control regrowth.



ZONE 1 - 12 months on - June 2005





## **BENEFITS challenges and lessons learned**

Revegetation has proceeded with incredible success, despite only one watering after planting and no seedling protection measures being implemented, even when the majority of planting occurred during drought years. The timing of the revegetation was crucial to the high success rate, with the late August/early September plantings coinciding with early spring rainfall on Montague Island.

Restored habitats now support a dense cover of native vegetation that Little Penguins can readily access for nesting.

Over 350 nest boxes were deployed within treated habitats. Little Penguins have readily occupied these artificial nests within weeks of their placement in the treated habitat. Their suitability as an interim nest site has been reinforced with the high rate of nest box fidelity demonstrated by Little Penguins, even when suitable vegetation cover is available. Annual monitoring of nesting pairs has identified that Little Penguins breeding within nest boxes breed with comparable success to pairs breeding within more naturally occurring nests, such as beneath the cover of native vegetation.

Kikuyu Grass was beginning to spread throughout shearwater breeding habitat (mainly found breeding on the north island and the eastern side of the south island). Controlling this spread has ensured suitable habitat remains available for these seabirds.

Work on Montague Island is not over, the program is ongoing with four additional intensive treatment zones to be treated from 2009 to 2012 and additional follow-up spraying to be undertaken to control Kikuyu Grass regrowth within all treated zones, including the aerial spray zone. The future success of the program hinges on securing funding to purchase seedlings and undertake operational burning and spraying of Kikuyu Grass.

The SHRP has addressed a significant environmental threat to nesting seabird species on one of New South Wales's most important offshore seabird islands. This ambitious project has successfully met many challenges through rigorous strategic planning prior to its implementation. In addition, findings and outcomes of previous research guided the planning process and were vital for ensuring project success.



*ZONE 1 - 2 years on - August 2006*

Some major logistical challenges, such as planting over 60,000 seedlings, have only been met by the NPWS working collaboratively with CSU undergraduate students and tourists undertaking guided conservation tours. Participating students and tourists have gained valuable field experience and knowledge of weed control principles and restoration processes, whilst making a valued contribution to a significant habitat conservation program. Many participants make return visits to Montague Island to see the long-term changes that they helped create.

***"The SHRP has addressed a significant environmental threat to nesting seabird species.."***

The SHRP showcases many island restoration principles and processes that have not been previously trialled. Prior to the program there was limited research conducted into methods of Kikuyu Grass control within coastal ecosystems.



*THE WORK CONTINUES - 2008 burning phase*

The SHRP has led the way for Kikuyu Grass control on offshore islands and has developed a successful restoration methodology that is applicable for control of Kikuyu Grass and restoration of degraded habitats on other offshore islands around Australia.

The important contribution the SHRP has made to island conservation cannot be understated. Central to this, is the acknowledgement that the program has ensured adequate suitable seabird

nesting habitat is available on Montague Island, now and in the future.

