



Human Impact on Taiaroa Head

A Biology Programme for
Secondary Students
at the **Royal Albatross Centre**

Programme Booklet for Teachers
2019

Programme Overview

Objective: To research the impact of human activities in relation to the biology of the Taiaroa Head ecosystem and the species living there.

Programme Description: Royal Albatross are one of many wildlife species living on Taiaroa Head. Breeding colonies of Fur Seals, Spotted and Otago Shags, Royal Spoonbills and Blue Penguins are just a few of the highlights. The impacts of human activity on the local ecosystem are both positive and negative. Students have the opportunity to view unique wildlife and investigate the impact of introduced species, changed vegetation, tourism, site development, pollution etc.

Time: 2 hours
Age Focus: Year 9-11
Curriculum Area: Science (NOS, Living world)

Spend the day on Otago Peninsula

New Zealand Marine Studies Centre:

There are a number of connecting programmes available at the NZ Marine Studies Centre and Aquarium. For programme details and bookings check out www.marine.ac.nz

Location

Travel Times (one way):

Dunedin to the Royal Albatross Centre, Taiaroa Head

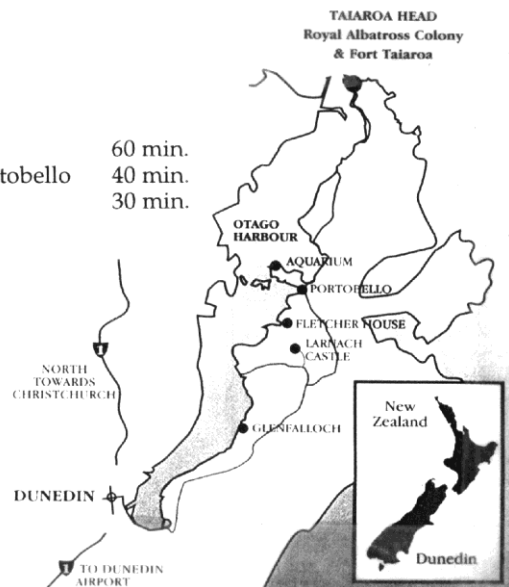
60 min.

Dunedin to NZ Marine Studies Centre (Aquarium), Portobello

40 min.

Royal Albatross Centre to NZ Marine Studies Centre

30 min.



Standard Programme Plan:

Time	Activity
	Arrive, meet guide at reception - <i>please arrive 10 minutes early</i>
0 min	Education Rm (30 min) - <i>Overview of Albatross lifecycle (display)</i> - <i>history of headland</i> - <i>introduce Residents of Taiaroa Head worksheet</i>
30 min	Observatory (30 min) - <i>viewing of Royal Albatross and Otago Shags</i> - <i>discuss features of Taiaroa Head site</i> - <i>Residents of Taiaroa Head worksheet</i>
1 hour	Pilots Beach (30 min) - <i>human impact trail (questions on worksheet)</i> - <i>focus on little blue penguins (management of non endangered sp)</i> - <i>focus on fur seals</i> - <i>Residents of Taiaroa Head worksheet</i>
1.5 hr	Displays (30 min) - <i>Enhancement activity / worksheet</i> - <i>Plastics Display</i> - <i>Seabird sol’n display (longlining)</i> - <i>Residents of Taiaroa Head worksheet</i> - <i>Human impact at sea discussion and tracking of Toroa</i>
2 hr	Education Rm (15 min) - <i>Wrap- up</i> - <i>Review positive and negative human impacts on Taiaroa Head site</i>
2.25 hr	Depart

Tour Guidelines

1. Supervisors

- Role of supervisors is to:
 - ensure that the students act in a responsible manner.
 - assist the students with the activities.
 - keep the noise level down and the group together.

2. Dress warmly

- It is always windy and cold at Taiaroa Head.

3. Arrive 10 Minutes Early

- If you are late, the time of your visit may be cut short as the observatory time is fixed and other tours are scheduled immediately after yours.
- Please allow time for a toilet break before the programme begins.

4. Group Size

- Please note only 25 people are allowed in the observatory at once.
- Please organise your students and supervisors into groups of 25 or less before arrival.

5. Programme Length

- The programme is 2 hours and 15 minutes long (includes 15-30 minutes in the Richdale Observatory).
- Please plan to have morning or afternoon tea before or after the programme (not during).

6. Lunch Areas

- Areas suitable for lunch include:
 - Pilots Beach, just below the headland, is a great place to view fur seals but please do not approach or disturb them.
 - grassy area to the east of the Royal Albatross Centre.
 - Education Room maybe available if the weather is wet (please check availability with Royal Albatross Centre staff in advance).

Shop and Cafeteria

- Please keep students out of these areas unless they are planning to make a purchase.

No Smoking

- To reduce the fire risk to the colony, smoking is not permitted.

Pre-trip Preparation

In order to ensure that students get the most out of the programme we suggest that some pre- and post-trip work is done in the classroom prior to the visit to the Royal Albatross Centre.

1. Risk Assessment

Review guidelines on the web site and review with trip supervisors.
(<http://www.albatross.org.nz/education/educational-resources/>)

2. Pre-trip Activities

Use the activities on the web site and the resources listed to introduce the students to albatross and the Taiaroa headland.

3. Background Information

Review the information provided in this booklet. Further information about albatross and the Taiaroa Headland site can be found on the web site and in the reference list

4. Work Sheets

Programme worksheets are attached and available on web site. Please make copies for your students as they will be used during the programme. Answer sheets are also attached to help with follow-up in the classroom.

5. Tour Guidelines

Please review the Tour Guidelines with your students and supervisors prior to the trip to the Royal Albatross Centre.

6. New Zealand Marine Studies Centre

Combine at the Royal Albatross Centre programme with a visit to the NZ Marine Studies Centre and Aquarium. Spend the morning at the Aquarium and the afternoon with the Albatross or vice versa. The programmes are complementary and together create a unique learning experience for your class (www.marine.ac.nz).

Resources

Royal Albatross Centre Activity Sheets

(download from www.albatross.org.nz/education/educational-resources/)

SECONDARY

Human Impact on Taiaroa Head Worksheets

These worksheets follow the programme objectives and look at positive and negative of human intervention and what we can do to help the Albatross

ALL LEVELS

Wildlife Viewing Guide

Wildlife viewing activity guide for teachers.

Wildlife Information Guide

Species to look for at Taiaroa Head and information.

Environmental Action Planner - “Tracking our Trash”

This action planner for Teachers gives an example of how students can make the vision to reduce the amount of rubbish going into the sea a reality.

Marine Rubbish Activity - “Tracking our Trash”

This activity takes students a few steps beyond just picking up trash from the local beach. By identifying the type of rubbish they can look at the source, harm rating on wildlife and find out how long it will take to break down in the ocean.

Problem with Plastic

Information on how our plastic rubbish is affecting wildlife in dramatic ways.

Relevant Web Sites

www.albatross.org.nz/education/educational-resources/

The education part of the Royal Albatross Centre website. Lots of activities and information to download.

www.albatross.org.nz

The Royal Albatross Centre site with background information on the colony and history of Fort Taiaroa.

www.doc.govt.nz/royalcam

Royal Cam s a 24-hour live stream of an albatross next during the breeding season.

www.doc.govt.nz/get-involved/conservation-education/resources/seabirds

Southern Seabird Solutions fact sheets and lesson plans
Excellent resources

www.savethealbatross.net

Save the Albatross campaign by RSPB and Birdlife International.

www.forestandbird.org.nz/campaigns/off-the-hook

Facts about the threatened seabirds and information on the campaign to prevent seabird deaths in the fishing industry.

www.wwf.org.nz/what_we_do/species/seabirds/

World Wide Fund for Nature site with information on conservation issues surrounding albatross.

www.albatrossencounter.co.nz/albatross/

A tourism operation in Kaikoura. Has a conservation section and information on what birds (including albatross) can be seen.

<http://science.howstuffworks.com/great-pacific-garbage-patch.htm>

<http://science.howstuffworks.com/clean-up-garbage-patch.htm>

How stuff works articles on the problem the Pacific ocean is facing with plastics and how we can 'potentially' clean it up.

Residents of Taiaroa Head – Answers

Pilot’s Beach

Species	Status	Taiaroa Head Population	Site Features <i>Why breed at Taiaroa Head?</i>	Human Impacts – NEGATIVE <i>What have we done that negatively impacts the species?</i>	Human Impacts – POSITIVE <i>What have we done that benefits the species?</i>
Blue Penguin <i>Native</i>	Least Concern	600	Soft ground for burrowing	<ul style="list-style-type: none"> - <u>Introduced predators</u> – stoats, cats, dogs, rats (take eggs) - <u>Rabbits</u> - compete for nesting space - <u>Fishing</u> net entanglement, - <u>Tourists</u> – noise, traffic, camera flashes, shortcut tracks to carpark, reduced nesting habitat - <u>Vegetation clearance</u> (past) 	<ul style="list-style-type: none"> - <u>Education</u> – signs with information and behaviour guidelines. - <u>Nesting boxes</u> - reduces predation from cats and dogs - <u>Research</u> to enhance conservation methods -
Fur seal <i>Native</i>	Least Concern	100 pups	<ul style="list-style-type: none"> - Sheltered rocky areas for raising pups e.g. pups learn to swim in rock pools - Close to feeding grounds in open ocean 	<ul style="list-style-type: none"> - Entanglement in marine debris (nets, plastic strapping) - Fishing – boat strike; seals killed because seen as competition e.g. ex-All Black. Trawl vessels <i>may</i> be having an impact. - In past – killed for meat (Maori) and fur (Europeans). <i>Point out Weller’s Rock sealing/whaling station</i> 	<ul style="list-style-type: none"> - Reduced human disturbance within the boundaries of the reserve. - Education – info board at Pilot’s Beach. - DOC rescue if seals are injured. - <i>Protected by law since 1916 - population moving northwards.</i>
Variable Oystercatcher <i>Endemic</i>	Least Concern	5-6	Close to food – feed on shellfish on rocky shores	<ul style="list-style-type: none"> Introduced predators Human disturbance 	Provide food through agriculture – birds forage on cultivated fields for grubs, insects & worms

Observatory

Species	Status	Taiaroa Head Population	Site Features <i>Why breed at Taiaroa Head?</i>	Human Impacts – NEGATIVE <i>What have we done that negatively impacts the species?</i>	Human Impacts – POSITIVE <i>What have we done that benefits the species?</i>
Otago Shag <i>Endemic</i>	Vulnerable	1,500	Protected open slopes for nesting - Close to food supply	- <u>Fishing</u> net entanglement. - <u>Disturbance</u> from human activity e.g. tourists (more likely to desert breeding colonies than other shag species). - <u>Introduced predators</u>	- Predator control - Reduced human disturbance in nature reserve. - Introduced grasses provides nesting material – <i>all other colonies use seaweed</i>
Northern Royal Albatross <i>Endemic</i>	Endangered	250	- Cleared slopes for nesting - Close to good feeding grounds off the coast, windy environment (45 th latitude), - Almost completely surrounded in sea (island-like for landing/take off).	- <u>Introduced predators</u> - <u>Fishing</u> - Long line and trawl. - <u>Marine pollution (Plastic)</u> - <u>Tourism</u> – noise disturbance, flashes - <u>Climate change?</u> Alters food availability - <i>Historic: Military - large community, guns fired, pets</i>	- <u>Vegetation clearance & construction of paths</u> for nesting; - <u>Tourism</u> – provides funds for ongoing conservation management; <u>education</u> - <u>Reduced human activity</u> e.g. restricted tourist viewing, no-fly zone, fencing - <u>Management</u> e.g. predator control, irrigation system, fostering.
Sooty Shearwater <i>Native</i>	Near Threatened	1,000	Bare hillside for building burrows, close to continental shelf	- Introduced predators, - Long line fishing. - Customary harvest on muttonbird islands - Rabbits – compete for nesting space - Lighthouse/security lights – birds become disorientated when coming back from the sea	- Predator control - Reduced human disturbance within reserve - Weed control (spraying) increases area available for burrowing - Rabbit control – burrows become available for nesting

Signposts

Species	Status	Taiaroa Head Population	Site Features <i>Why breed at Taiaroa Head?</i>	Human Impacts – NEGATIVE <i>What have we done that negatively impacts the species?</i>	Human Impacts – POSITIVE <i>What have we done that benefits the species?</i>
Spotted Shag <i>Native</i>	Least Concern	1,500	Cliffs to nest on, close to feeding grounds in harbour	Fishing – net and line entanglement. <i>Very few negative impacts – nest on inaccessible cliff ledges so largely unaffected by predators and impacts of land clearance. Minimal disturbance from tourists at viewing area.</i>	- Fenced off cliff area. - Education – information signs, increase awareness of set nets - Introduced grasses – use for nesting
Little Shag <i>Native</i>	Least Concern	40	Close to food Trees to nest in	- Fishing net entanglement - Noise disturbance – restricted to trees away from water	Reduced human disturbance in reserve
Royal Spoonbill <i>Native</i>	Least Concern	50	- Trees for nesting - Red-billed gull colony gives early warning of threats. - Close to feeding grounds in harbour	- Vegetation clearance has reduced nesting habitat - Noise and visual disturbance from tourists boats	- Enhanced red-billed gull colony through predator trapping (gulls alert spoonbills of threats) - Tourist boats asked to keep their distance from nesting area to reduce disturbance.
Red-billed Gull <i>Native</i>	Threatened	5,000	- Large undisturbed space - Lots of nesting material	- Introduced predators – rats, stoats, ferrets. - Fishing – entanglement with lines or hooked while scavenging behind fishing boats.	- Predator control - especially rats - Reduced human disturbance within reserve area. - Urbanisation and agriculture (cultivated fields) provides readily available food.

<p>Black-Backed Gull</p> <p><i>Native</i></p>	<p>Least Concern</p>	<p>40</p>	<p>Close to food – farmland & other wildlife (predates on smaller birds)</p>	<p>Could be affected by pollution (contaminants, chemicals) when scavenging in rubbish</p>	<p>Provide food – urbanization and agriculture (livestock eyeballs, cultivated fields); reduced human disturbance in reserve area</p>
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What would happen if? - Answers

Protection = aspects that minimise detrimental human impacts

What would happen if...	Impact	Management Techniques	How can YOU help prevent it happening or help with the management of the situation?
An albatross landed in the parking lot?	<ul style="list-style-type: none"> - <i>bird will be frightened, disorientated</i> - <i>public may disturb it</i> 	<ul style="list-style-type: none"> - <i>move bird back into the colony if possible (may be difficult to catch)</i> - <i>keep the public away until it flies away itself</i> 	<ul style="list-style-type: none"> - <i>educate the public about how they could stress the bird by trying to get too close for photos etc.</i> - <i>investigate if the size of the reserve should be increased?</i>
A boat went aground at Aramoana and spilled oil?	<ul style="list-style-type: none"> - <i>probably would have little impact on the Albatross, however an oil spill further out at sea where the birds are feeding would have a major impact – on feathers would affect ability to fly and insulating properties of feathers, if ingested would be toxic to birds</i> - <i>at Aramoana would have impact other species that live on the headland (seals, shags, gulls, penguins etc.)</i> 	<ul style="list-style-type: none"> - <i>Otago Regional Council has an oil spill recover plan with a section on management of wildlife – birds would need to be caught and cleaned</i> - <i>Oil needs to be contained as soon as possible to reduce spread and contact with wildlife</i> 	<ul style="list-style-type: none"> - <i>educate the public on how impacts of an oil spill and strategies to reduce the impact</i> - <i>train people to help with the wildlife rescue in the event of a spill</i> - <i>lobby decision makers to ensure all oil tankers in NZ waters have double hulls etc.</i>
Dunedin had an unusually hot summer?	<ul style="list-style-type: none"> - <i>incidence of fly strike increases as adult stands up and leaves egg, chick exposed</i> - <i>heat stress</i> - <i>increase of dead embryos (“glad-wrapped” chick)</i> 	<ul style="list-style-type: none"> - <i>fly traps, manual removal of maggots</i> - <i>water spraying</i> - <i>move egg to better area or to incubator</i> 	<ul style="list-style-type: none"> - <i>actions / publicity campaigns to reduce global warming</i> - <i>better weather predictions</i>

What would happen if...	Impact	Management Techniques	How can YOU help prevent it happening or help with the management of the situation?
The number of stoats, ferrets and wild cats in the area increased?	<ul style="list-style-type: none"> - the number of eggs and chicks killed or bitten would likely increase (Last chick eaten was 5 yrs ago 2 yrs ago one was bitten, by a cat?) - other species impacted 	<ul style="list-style-type: none"> - trapping, shooting, poisoning (note success is measured by the number of chicks/eggs not eaten, not by the number of animals caught in traps) 	<ul style="list-style-type: none"> - educate the public about the impact of these animals - develop a campaign to get cats fixed, and not to let unwanted kittens go wild - run workshops for landowners to train and encourage them to trap these animals on their properties
There was a fire in the reserve?	<ul style="list-style-type: none"> - Would kill the eggs and chicks as they are unable to fly away - reduce nesting material and damage nesting habitat - severity of the impact depends on the time of year (losing chicks in one season may not be too damaging) 	<ul style="list-style-type: none"> - fire prevention - fire control - removal if eggs and chicks would be ideal but staff must get themselves safe as a first priority - revegetation 	<ul style="list-style-type: none"> - prevent smoking in the area - educate the public on the fire dangers - revegetation

Class Room Enhancement Activity - Answers

Enhancement – aspects that improve on nature

There maybe more than one answer to each method.

1.

Intervention Methods	<i>Effect of these Methods</i>
Weed Control	a. Action of removing introduced plants that make the headland less suitable for nesting and take off.
Dummy Egg	b. Object used to keep breeding pairs at the nest after the egg or young chick is removed for weighing, measuring or keeping in incubator for a while. Has a calming effect when present to nervous or aggressive breeding adults during nest checks.
Hand Rearing	c. Action where chicks are housed and fed solely by Wildlife Rangers when both parents die or disappear and no foster pair is available.
Rabbit Exclusion	d. Lagomorph control to reduce bare patches of ground that attract flies; increase vegetation and nesting material for all seabirds; reduce competition for space with burrowing seabirds and reduces erosion and prey for introduced predators.
Incubator	e. Device used to keep eggs safe when high risk of desertion and/or infection.
Supplementary Feeding	f. Action of additional feeding by rangers when one parent goes missing or when pair is unable to supply the chick with enough food to stay healthy.
Drug Treatment	g. Used to treat disease (e.g. Aspergillosis and other infections)
Predator Trapping	h. Technique used to eliminate threat from feral cats, mustelids (Stoats, ferrets), hedgehogs and rats.
Restricted Viewing	i. To reduce disturbance from the viewing public during courtship and egg laying period.
Supply extra nesting material and shelter	j. Provides vulnerable chicks or eggs with protection from extreme weather.
Security Fence	k. Used to control access of humans, stock and dogs to the nature reserve.
Window Tinting	l. Used to minimise visual disturbance to nesting birds from people in the observatory
Leg Banding	m. Technique for identifying individual birds to keep a reliable record of individuals life history, presence on the headland, population data and health information.
Manual Treatment of eggs & chicks	n. Hand removal of maggots on hatchlings or very young chicks to prevent infection from ‘fly strike’. Peppermint essence to repel placed in tubes in the nest when the egg is close to hatching.
Nest check & Chick weighing	o. Weekly monitoring of eggs and chicks to check on their health, parent presence and nesting behaviour.
First Flight rescue	p. Fledglings that land in the harbour and are unable to take off again are returned to the headland or taken out to the open ocean where there is more wind.
Candling	q. Technique used to see if an egg is viable
Nest sprinklers	r. Device used to ensure the nesting Albatross do not die from heat-induced organ failure due to extreme climatic conditions.

Outline any negative aspects to these management techniques?

1. *Disturbance (visual and noise)*
2. *Handling by humans*
3. *Eggs / chicks may be rejected by parents*

4. *Transfer of eggs from nest to nest or to incubator could spread infection*
5. *Revegetation may provide more cover for predators, change areas where juveniles display, flowering plants may increase blowfly population and could affect flight patterns over headland – which could affect nesting and displaying areas.*

2. How can the rangers tell if the birds are stressed?

- *When stressed, albatross can show signs of shaking, backing away and/or spitting.*

3. Do you think these enhancement techniques should be used to increase the fledging rate of Royal Albatross at Taiaroa Head?

- *Management has increased the fledging rate by ~20%*
- *75% of non managed offspring survive to 5 years, only 60% of those that are managed survive to 5 years*

(see Clive Robertson's paper attached – Effects of Intervention on the Royal Albatross Population at Taiaroa Head, 1937-2001)

- 75% of non managed offspring survive to 5 years, only 60% of those that are managed (*probably would have died without help*)
- Survival rate of managed offspring to 5 years depends on the degree of management
- Most successful of managed offspring were those that were fostered to natural parents (75%), recovered from the harbour (71%), high level of manual intervention (hand rearing, incubator, drugs) – only 50% survivorship to five years.
- Note there is a long lag time before the benefits of intervention are seen (6-10 years before available to breed at the colony)
- In the past 12 years (heavily affected by both climatic and blowfly influences) only 33% of chicks would have fledged without significant intervention – this was raised to 72% by intervention.

Managed chicks – defined as those that have had significant hand rearing, been fostered, spent time in incubator, recovered from harbour after failed first flight or been managed in some way to avoid death.

Preventative Intervention – required to reduce the risk of something more serious occurring

