New Zealand Seabirds

Important Bird Areas and Conservation

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GIVING NATURE A VOICE

BirdLife INTERNATIONAL

Birds New Zealand

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This document has been prepared for Forest & Bird by Chris Gaskin, IBA Project Coordinator (NZ).

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Front cover: New Zealand and White-faced Storm Petrels, Hauraki Gulf. Photo: Martin Berg
Endpapers: Fairy Prions and Buller's Shearwaters, Hauraki Gulf. Photo: Jon Irvine
Facing page: Two Shy Albatrosses, Chatham and White-capped Albatrosses, Stewart Island. Photo: Jon Irvine
Back cover: Rockhopper Penguins, Campbell Island. Photo: Kyle Morrison

New Zealand Seabirds

Important Bird Areas and Conservation

Grey-headed Albatross with chick on nest, Bull Rock, Campbell Island.
Photo: Kyle Morrison

Taking a bird's eye view

Identifying areas that are important for New Zealand's seabirds.

The IBA programme, this document and the supplementary reports present a comprehensive overview of New Zealand's seabirds, allowing us to visualise where they breed and the extent of their foraging across the marine, and, for inland breeding gulls and terns, freshwater environments.

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Black-fronted Tern and Southern Royal Albatross. Photos: Frederic Pelsy

Foreword – John Croxall,

CHAIR, GLOBAL SEABIRD PROGRAMME, BIRDLIFE INTERNATIONAL

New Zealand is the undisputed seabird capital of the world, holding:

- More threatened seabird species than anywhere else in the world
- Highest number of breeding seabird endemics in the world (36 species), seven times higher than Mexico in 2nd place (5 species)
- More than one-third of seabird species are known to occur within New Zealand's EEZ, including species breeding outside the region
- Approximately 14 million pairs of breeding seabirds.

For anyone interested in birds globally the very mention of sites such as the "Hauraki Gulf", "Taiaroa Head" and "Kaikoura" immediately evokes images of scores of spectacular albatross and petrels viewable at close range. If you have visited these sites already, you'll be keen to return. If you haven't they will likely be top of your list of places to visit soon.

To have such sites recognised as Important Bird Areas (IBAs) provides objective endorsement of their global importance. Adding the New Zealand component to the global IBA assessment fills a vital piece of the puzzle in our understanding of the critical sites for seabird conservation worldwide. Thus the current project has identified to date:

1. Ninety-seven IBA sites on land, including offshore islands, principally colony sites, but also including major roosts and non-breeding congregatory sites
2. Forty-four sites on inland rivers (for inland breeding gulls and terns) and in coastal areas such as harbours, estuaries and lagoons
3. Twenty-six seaward extensions for foraging of limited range species and coastal and continental shelf areas
4. Forty-three areas for pelagic seabirds.

On land New Zealand researchers have shown the world how to study and revitalise seabird populations via their work eradicating invasive species at key seabird breeding IBAs and the translocation of various seabird species from one IBA to another to alleviate threats and safeguard populations. At sea there is still much to do, with many New Zealand species facing threats both home and abroad. Improved management of a range of activities such as fishing, mining and offshore renewables is urgently needed within New Zealand waters. Once again New Zealand is ideally placed to take the lead and show the world how conservation should be done, this time from the perspective of marine spatial planning.

Many New Zealand seabird species are highly migratory spending time in other regions of the Pacific and Indian Oceans, reaching as far as the coastal waters of Japan, Alaska, California, South America, South Africa and Argentina. The movement of these species highlights the overriding responsibility that all nations have to share in the sustainable use and management of marine resources. They are a prime example of the need for communication, collaboration and conservation across ocean basins if we are to safeguard the ecological and economic integrity of seabirds for the future. The IBA network is a vital starting point in identifying the priority sites whose management and protection is paramount.

Prof. John Croxall, albatross research at South Georgia, South Atlantic. Photo: BirdLife International

As we exercise our duty of care and maintain awareness of what is happening with avian species, we also embark on processes of conserving the natural environment that are ultimately essential to our own survival. In the course of just living, the free-flying and readily observed birds sample the atmosphere, the oceans, the plants, the forests and even insect life. If any one of these is compromised, the first place that such effects may become obvious is in the health and numbers of birds, both within and between species. No military commander would post sentinels, then ignore their warning cry and fail to monitor their continued wellbeing. As a defensive strategy in the face of massive and unpredictable environmental change, we will do well to think in terms of closely watched birds.

From Doherty, P.C. (2012). *Their fate is our fate: How birds foretell threats to our health and our world*. The Experiment, New York.

Australasian Gannet sentinel at Cape Kidnappers. Photo: Stefanie Ismar

Forest & Bird
GIVING NATURE A VOICE

Forest & Bird is New Zealand's largest independent conservation organisation and works to preserve our natural heritage and native species. Originally formed to protect our native forests and birds, our role has since grown to include protection of all native species and wild places – on land and in our oceans, lakes and rivers.

"We give nature a voice. We speak for all our threatened species and fragile places – from endangered Maui's dolphins to high-country tussock-lands. We work with other environmental organisations on environmental issues in New Zealand's Exclusive Economic Zone, the wider Pacific and in Antarctica. We are not a government organisation and do not receive government funding – we rely on the generosity of our members' subscriptions, donations and bequests to carry out our conservation work."[1]

Forest & Bird is New Zealand's longest-serving conservation organisation, formed in 1923 in response to widespread extinction of native species and destruction of our native forests. Since formation Forest & Bird has played an active role in preserving New Zealand's environment and native species and grown to number 70,000 members and supporters.

Forest & Bird members are people who care passionately about New Zealand's unique natural environment and native species – and want to make sure that these natural treasures are protected so that they can continue to be enjoyed by future generations. Forest & Bird staff work to bring about better legislation and policy that supports environmental protection. They also co-ordinate hand's-on restoration projects and educate people about environmental issues through children's club, The Kiwi Conservation Club, through publications and public awareness campaigns. Volunteers in 50 branches around New Zealand work at the flax roots on community conservation projects and as advocates for nature.

BirdLife
INTERNATIONAL

BirdLife International is a partnership of people for birds and the environment. As a worldwide community, BirdLife International is the leading authority on the status of birds and their habitats. Over 10 million people support the BirdLife Partnership of national non-governmental conservation organisations and local networks. Partners – national conservation organisations operating in 116 territories – work together on shared priorities, programmes, and policies, learning from each other to achieve real conservation results. The BirdLife Partnership promotes sustainable living as a means of conserving birds and all other forms of biodiversity.

Birds are beautiful, inspirational and international. Birds are excellent flagships and vital environmental indicators. By focusing on birds, and the sites and habitats on which they depend, the BirdLife Partnership is working to improve the quality of life for birds, for other wildlife (biodiversity), and for people. BirdLife's aims are to:

- Prevent the extinction of any bird species
- Maintain and where possible improve the conservation status of all bird species
- Conserve and where appropriate improve and enlarge sites and habitats important for birds
- Help, through birds, to conserve biodiversity and to improve the quality of people's lives
- Integrate bird conservation into sustaining people's livelihoods.

1 http://www.forestandbird.org.nz/about-us

Birds New Zealand (OSNZ) has a number of aims and objectives, among which are:

- To encourage organise and promote the study of birds and their habitat use, particularly within the New Zealand Region
- Foster and support the wider knowledge and enjoyment of birds generally
- Promote the recording and wide circulation of the results of bird studies and observations
- Assist the conservation and management of birds by providing information from which sound management decisions can be derived.

It is from these aims that the Society has been pleased to support this project to identify the important areas for New Zealand seabirds. New Zealand is considered to be a major hotspot for seabirds and it is important that the data collected by members is put to use in ensuring that seabird breeding and feeding areas are identified and protected.

GLOBAL PROGRAMMES

BirdLife International's Important Bird Area (IBA) Programme is one of a number of global programmes for conservation – others include Climate Change, Flyways, Preventing Extinctions, Forest of Hope and the Global Seabird Programme.

PACIFIC PARTNERSHIPS

Forest & Bird is BirdLife International's partner in New Zealand, and is working with partners in Australia, New Caledonia, French Polynesia, Fiji, Palau and the Cook Islands on shared programmes to deliver conservation for the benefit of nature and people in Australasia and the South Pacific.

Photo montage: Sooty Terns. Photo: Gareth Rapley
Vatu Vara, Fiji Islands. Photo: Chris Gaskin

What are Important Bird Areas?

Important Bird Areas (IBAs) are sites that are recognised as internationally important for bird conservation and known to support key bird species and other biodiversity. The function of the IBA Programme is to identify, and help focus and facilitate conservation action for a network of sites that are significant for the long-term viability of naturally occurring bird populations, for which a site-based approach is appropriate.

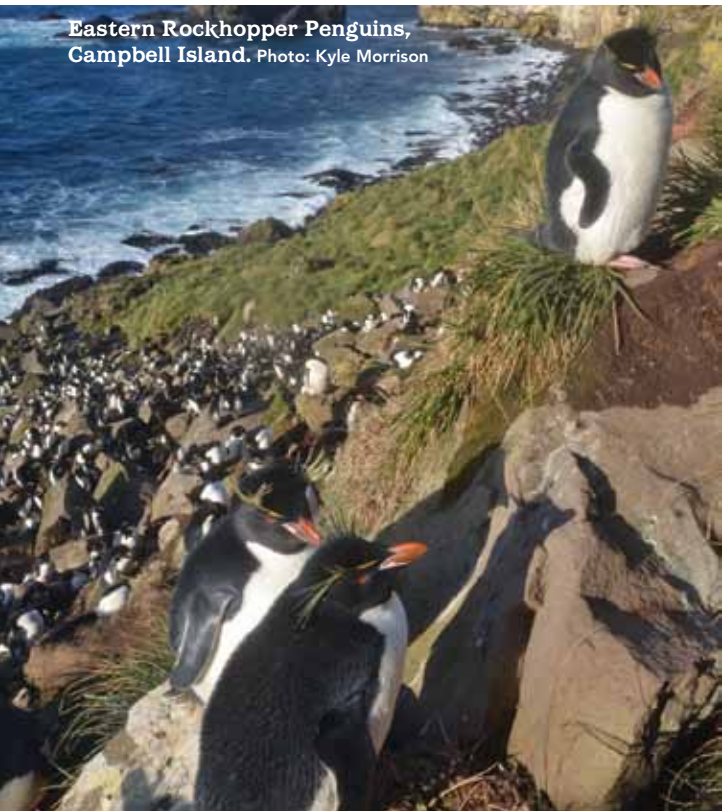
The continued ecological integrity of these sites will be decisive in maintaining and conserving such birds. Legal protection, management and monitoring of these crucial sites are all important targets for action, and many (but not all) bird species may be effectively conserved by these means. Patterns of bird distribution are such that, in most cases, it is possible to select sites that support a number of species.

The IBA Programme is global in scale and more than 12,000 IBAs have already been identified worldwide, using standard, internationally recognised criteria for selection.[2] This network may be considered as a minimum essential to ensure the survival of these species across their ranges, should there occur a net loss of remaining habitat elsewhere through human, or other, modification. Therefore, the consequences of the loss of any one of these sites may be disproportionately large. Since IBAs are identified, monitored and conserved by organisations and individuals working together on the ground, the IBA Programme can be a powerful way to build national and local institutional capacity and to set an effective conservation agenda.

Starting with Seabirds in New Zealand

Elsewhere in the world, the general approach has been to look at all bird populations and identify IBAs on that basis. In New Zealand, where seabirds make up over half our endemic and native bird species, identifying IBAs for seabirds first and foremost recognises New Zealand's rich and diverse seabird fauna. Also, because most seabirds are colonial breeders, it provided the opportunity to work with the IBA process within the

2 Fishpool, L.D.C. and Evans, M.I. (Eds) 2001. *Important Bird Areas in Africa and associated islands: Priority sites for conservation. BirdLife Conservation Series No 11.* Pisces Publications and BirdLife International. Newbury and Cambridge, UK



Eastern Rockhopper Penguins, Campbell Island. Photo: Kyle Morrison

Chatham Albatrosses, Pyramid Rock. Photo: Lorna Deppe

Hutton's Shearwaters off Kaikoura. Photo: Dennis Buurman

New Zealand context before identifying sites solely for other bird groups (land, shore and water birds). However, this initial focus on seabirds has not meant these other birds are neglected, far from it. In fact many of the IBAs identified to date include land, shore and/or water birds as trigger species (see section IBA SITES ON LAND – pages 16-21). Thus the work towards a complete IBA network for New Zealand's birds is well underway.

GLOBAL IBA CRITERIA

A1. More than threshold numbers of one or more globally threatened species

A2. More than threshold species complements of restricted-range species

A3. More than threshold species complements of biome-restricted species

A4. More than threshold numbers of one or more congregatory species, including:

- A4i >1% of the biogeographic population of waterbirds
- A4ii >1% global population of seabirds
- A4iii >10,000 pairs, seabirds or 20,000 individuals, waterbirds
- A4iv > Threshold numbers at migration bottleneck sites.[3]

The IBA selection process follows the Ramsar Convention in stating that IBAs must meet threshold numbers in two-thirds of years for which there is adequate information.[4] The system uses IUCN/BirdLife International threat rankings and taxonomy including common names.

Note: New Zealand has its own Threat Classification system administered through the Department of Conservation (DOC),[5] and bird taxonomic group, the OSNZ Checklist Committee.[6] These national classifications and listings are recognised in individual site profiles presented in the supplementary documents. Also, to avoid confusion in this advocacy document New Zealand common names are used with IUCN/BirdLife International names bracketed – eg. Black (Parkinson's) Petrel, Chatham Island Taiko (Magenta Petrel), Orange-fronted (Malherbe's) Parakeet.

3 http://www.birdlife.org/datazone/info/ibacriteria

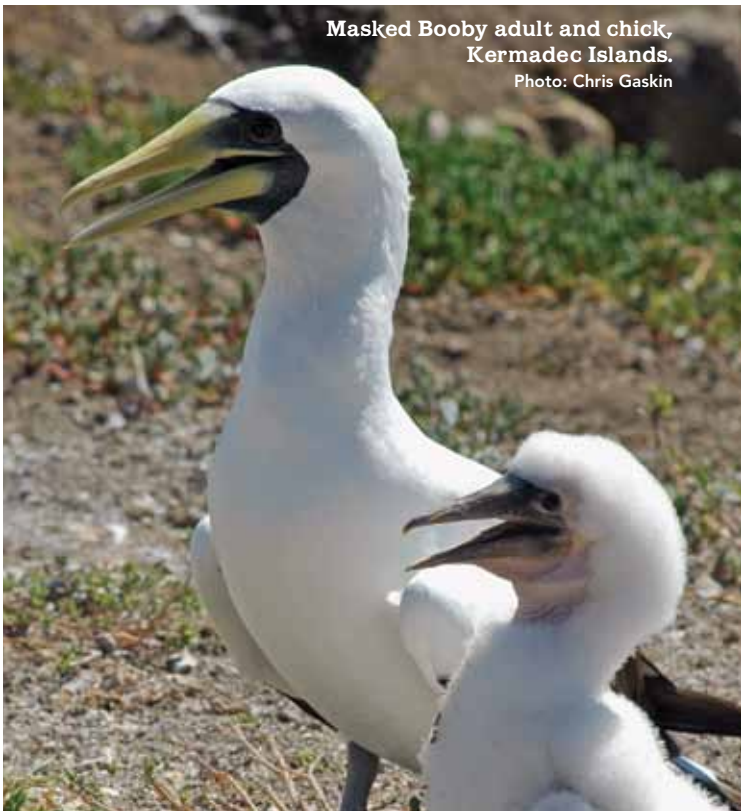
4 Dutson, G., Garnett, S., Gole, C., 2009. *Australia's Important Bird Areas: Key sites for bird conservation.* Birds Australia, Melbourne. 40pp.

5 Robertson, H.A., Dowding, J.E., Elliott, G.P., Hitchmough, R.A., Miskelly, C.M., O'Donnell, C.J.F., Powlesland, R.G., Sagar, P.M., Scofield, R.P., Taylor, G.A. 2013. *Conservation status of New Zealand birds, 2012. New Zealand Threat Classification Series 4.* Department of Conservation, Wellington. 22pp.

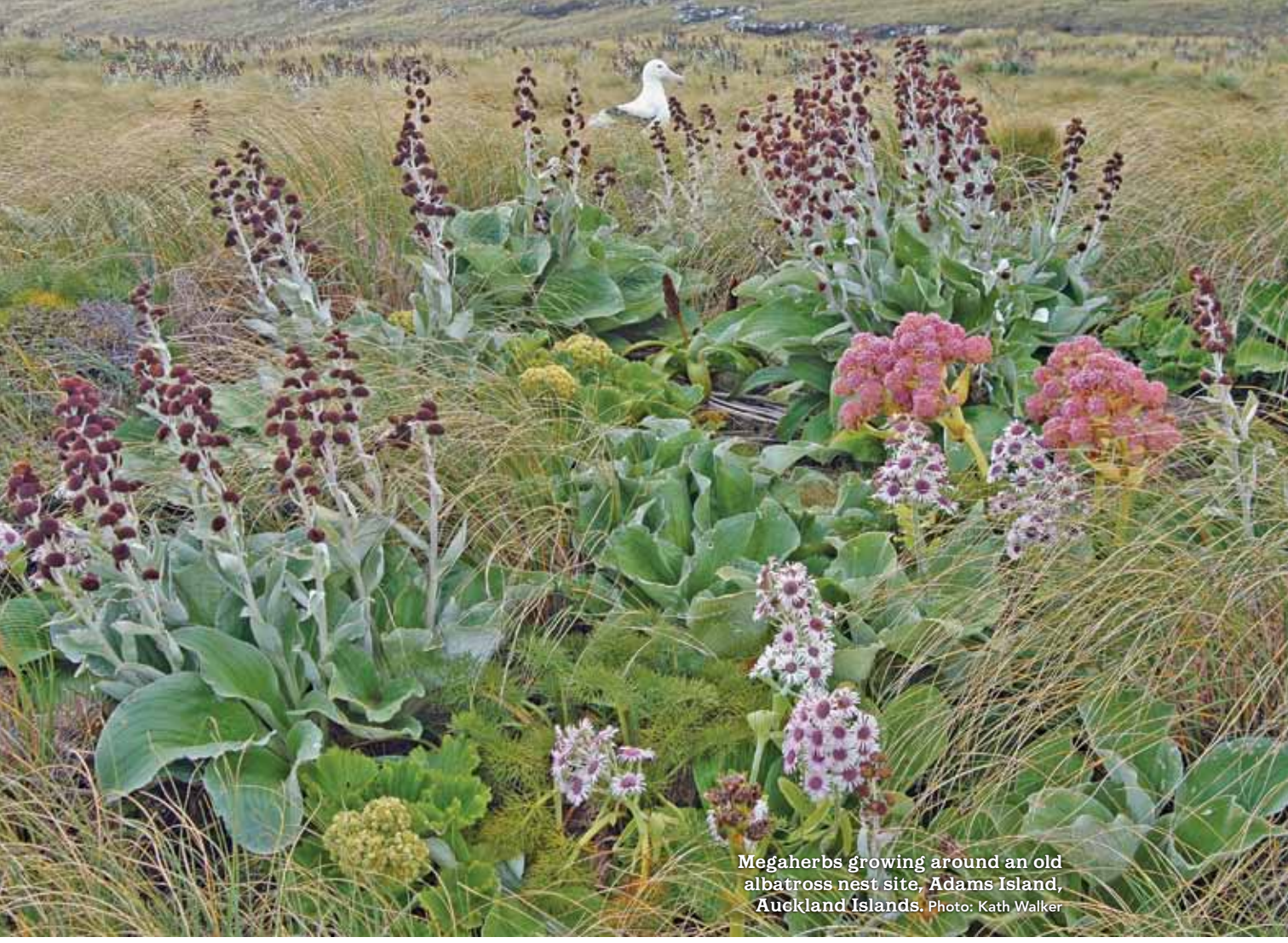
6 OSNZ (Ornithological Society of New Zealand) Checklist Committee 2010. *Checklist of the birds of New Zealand, Norfolk and Macquarie Islands, and the Ross Dependency, Antarctica. 4th edition.* Te Papa Press, Wellington. 464pp.

Southern Royal Albatrosses 'gamming', Campbell Island. Photo: Kyle Morrison

Kermadec Petrel pair. Photo: Chris Gaskin



Masked Booby adult and chick, Kermadec Islands. Photo: Chris Gaskin



Megaherbs growing around an old albatross nest site, Adams Island, Auckland Islands. Photo: Kath Walker

Seabirds: Should we Care?

Biological diversity underpins ecosystem functioning and the provision of ecosystem services essential for human well-being. It provides for food security, human health, the provision of clean air and water; it contributes to local livelihoods, and economic development.[7]

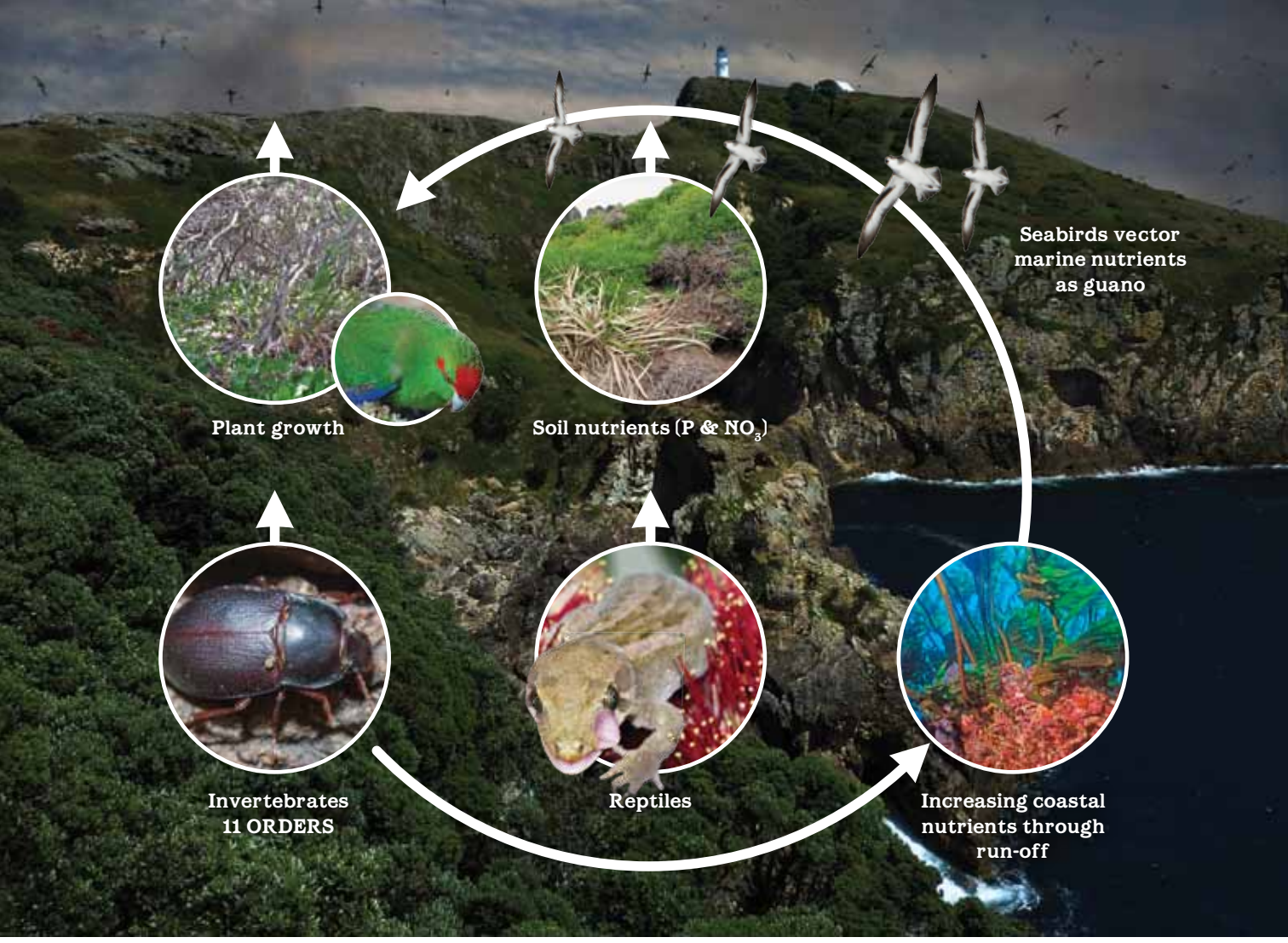
As predators at the top of the food chain, seabirds are crucial components of marine ecosystems and possess attributes that make them useful as indicators of change in the marine environment. Given that there is an increasing demand for relevant indica-tors for the marine environment, seabird populations represent a viable and cost-effective 'canary in the cage' for the long-term assessment of marine ecosystems across broad spatial scales.

Fluctuations of seabird populations can have important implications for the ecology of their terrestrial ecosystems in which they are situated. Seabirds play a major role in shaping the ecology of terrestrial communities by acting as links between the land and sea, importing sources of marine-derived nutrients. Given the removal of the mainland seabird fauna from New Zealand, it is likely terrestrial communities are experiencing very different conditions to those prevailing for much of their evolutionary history.[8]

Seabirds are ranked by the IUCN as the world's most threatened bird grouping. Threats to seabirds here in New Zealand include: introduced predators, which represent the most significant onshore threat to seabird populations worldwide; modification of sea-

7 Convention on Biological Diversity 2010

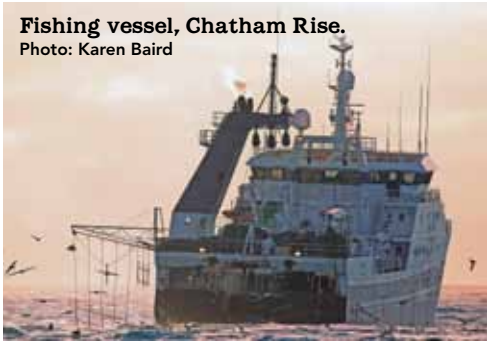
8 Gaskin, C.P., Rayner, M.J. 2013. *Seabirds of the Hauraki Gulf: Natural History, Research and Conservation.* Hauraki Gulf Forum, Auckland. 142pp.



Seabird transfer of marine-derived nutrients to land and resulting impacts on terrestrial ecosystem productivity. Graphic from Rayner, M.J., Gaskin, C.P. (2013). Hunting the New Zealand Storm Petrel in a world centre for seabird diversity. Presentation at the Australasian Ornithological Conference, 4-7 December 2013, Auckland, New Zealand. Photos: Shelley Heiss-Dunlop, Dylan van Winkel, Neil Fitzgerald, Kim Westerskov, Karen Baird, Chris Gaskin

bird breeding habitats and rapid increase in coastal subdivisions; marine pollutants that enter the marine environment (ie. effluent, chemical contaminants, plastics and oil and petroleum products); by-catch of seabirds by commercial fishing boats. The impact from recreational fishing, while likely to be considerable, is poorly understood. With increasing offshore oil, gas and mineral exploration and the potential for large-scale extraction, concerns have been raised about New Zealand meeting our obligations "to preserve and protect the marine environment"[9] including seabirds.

9 United Nations Convention on the Law of the Sea (UNCLOS) - http://www.un.org/depts/los/convention_agreements/texts/unclos/part12.htm



Fishing vessel, Chatham Rise.
Photo: Karen Baird

***Rena* oil spill.**
Photo: Kim Westerskov

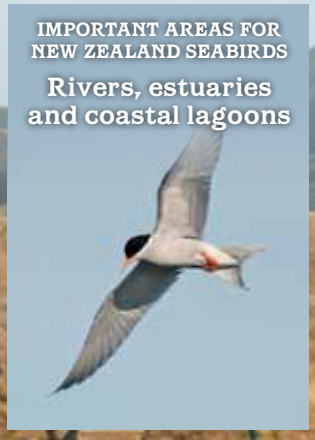
The New Zealand IBA Network – Seabirds

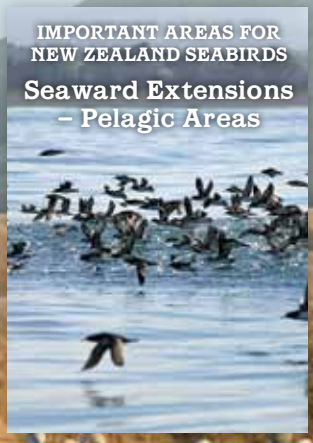
Important Bird Areas (IBA) for New Zealand's seabirds fall into four categories:

1. Ninety-seven IBAs have been identified for sites on land, including offshore islands, principally colony sites, but also including major roosts and non-breeding congregatory sites
2. Forty-four sites on inland rivers (for inland breeding gulls and terns) and in coastal areas such as harbours, estuaries and lagoons have been identified as IBAs under the current project
3. Twenty-six seaward extensions for foraging of limited range species and coastal and continental shelf areas
4. And forty-three areas for pelagic seabirds have been identified to date.

SUPPLEMENTARY REPORTS

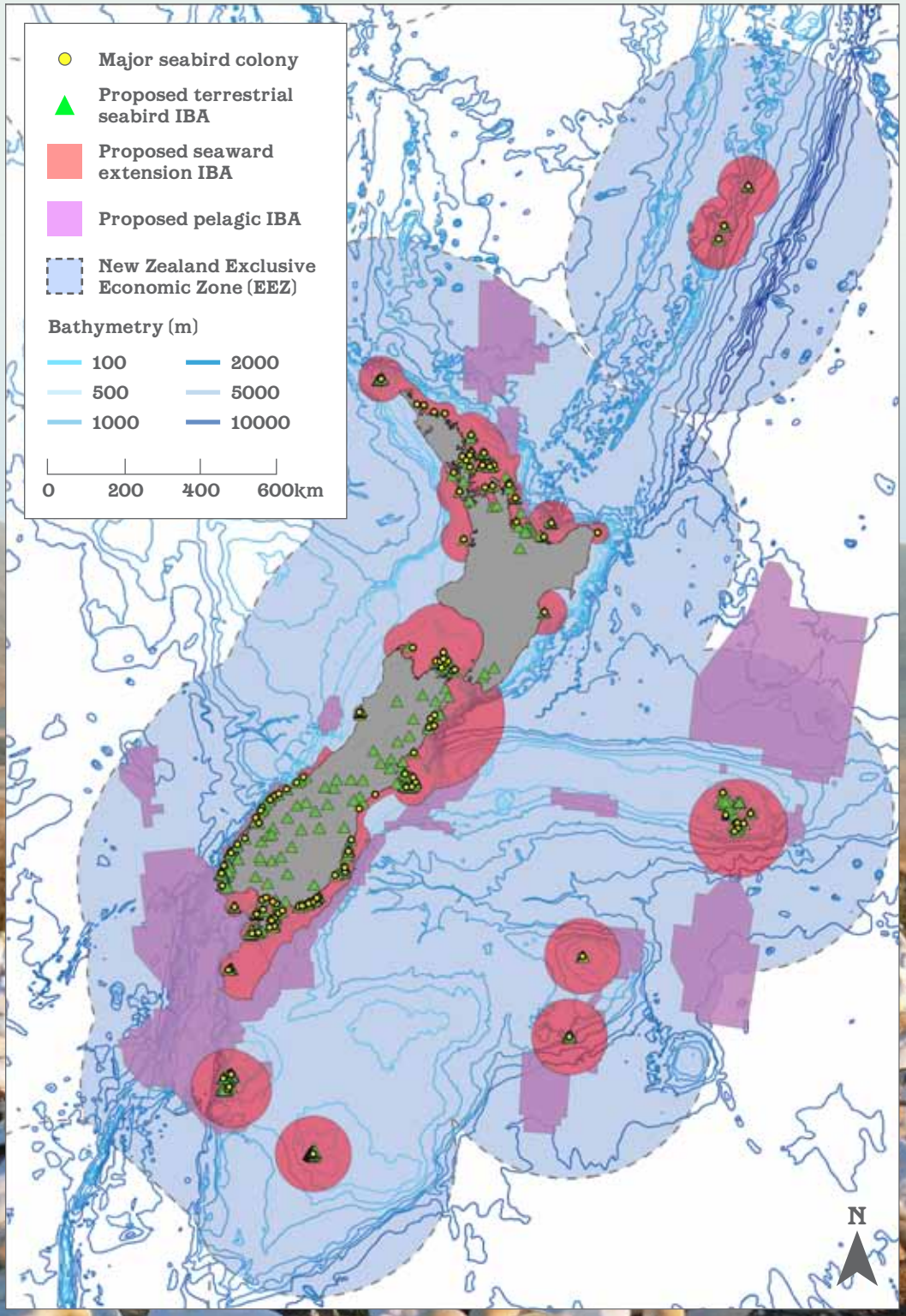
This document provides an overview of the IBA programme. Three supplementary reports have been prepared which provide site profiles for all IBAs identified under the current programme. All these documents are available online at **www.forestandbird.org.nz/important-bird-areas**





Australasian Gannets, Cape Kidnappers, Hawkes Bay. Photo: Stefanie Ismar

The Important Bird Area (IBA) network for New Zealand's seabirds. Terrestrial IBA sites for seabirds are shown as green triangles. Major seabird colony sites (yellow circles) are the colonies for which the seaward extension IBAs have been identified. Marine IBAs include seaward extensions (red polygons) and the pelagic IBAs identified to date (purple polygons).



Snares Crested Penguins, Snares Islands Photo: Dave Houston

Mokohinau Islands
Photo: Abe Borker

Punakaiki coast
Photo: John Kendrick

IBA Sites on Land

Many of the IBAs identified for New Zealand's seabirds were straightforward. The Bounty Islands provide an obvious example. A good number of our other offshore islands also qualify, for example: The Pyramid, Forty-Fours, Sisters (all Chatham Islands Group), Poor Knights Islands (Hauraki Gulf), and Macauley Island (Kermadec Islands Group).

Main island sites present a more complex picture. Just south of Punakaiki is the only breeding area for Westland Petrel, but there are also significant breeding sites for Spotted Shag nearby. Sooty Shearwater, Little Penguin, White-fronted Tern and Black-backed Gull also breed there. In addition, the area is home for a significant population of Great Spotted Kiwi, a species of real conservation concern. So, when considering boundaries for IBA we either opted for the narrow approach and went for individual sites, or took a broader approach extending boundaries to include multiple species and sites, including terrestrial species.

Elsewhere on the main islands individual sites include Hutton's Shearwater colonies in the mountain valleys of the Seaward Kaikoura Range and Fiordland Penguin colonies in South Westland and Fiordland.

All five island groups of the New Zealand Subantarctic islands are described by the United Nations Environment Programme as "the most diverse and extensive of all sub-antarctic archipelagos" and were honoured with World Heritage Site status in 1998. They are also National Nature Reserves under New Zealand's Reserves Act 1977. The only remaining animal pest species on our Subantarctic islands are pigs, cats and mice on the main Auckland Island and mice on the Antipodes Islands.

In considering the main Auckland Island, specific breeding sites were identified for Yellow-eyed and Eastern Rockhopper Penguins (multiple sites), Auckland Island Shag

Bounty Islands
Photo: Paul Sagar

Hutton's Shearwater colony site, Kaikoura Range
Photo: Lindsay Rowe

Chatham Albatross, adult and chick
Photo: Lorna Deppe

(multiple sites) and White-capped Albatross (SW Cape). Other trigger species, however, such as Antipodean (Gibson's) Albatross are scattered across the island but are poorly surveyed. Thus the whole of the island meets the criteria for an IBA, but with significant threats remaining. Other large islands with predators, for example, main Chatham Island, Rangiauria/Pitt Island and Aotea/Great Barrier Island, have been treated differently, with IBAs restricted to areas around individual or, in some cases, groups of breeding sites for particular threatened species (eg. Chatham and Pitt Island Shags, Chatham Island Taiko (Magenta Petrel), Black (Parkinson's) Petrel).

When identifying sites as IBAs it made sense to consider other bird species, that is, terrestrial, shore and water birds. Take Te Hauturu-o-Toi/Little Barrier Island, for example. From a seabird perspective, it is the only known breeding site for the New Zealand Storm Petrel, has something like 98% of the world's population of Cook's Petrel breeding there, and there is also a small but significant number of endemic Black Petrel. Other seabird species are returning following eradication of predators. At the same time, the island is also the stronghold for endangered Hihi (Stitchbird), and is a vitally important refuge to a number of other threatened species introduced to the island such as Kakapo, Kokako, Saddleback and naturally occurring species like the Long-tailed Cuckoo. A good number of other islands (or island groups) that fall in this category are the Snares and Campbell Islands Group, South-east Island (Chatham Islands Group) and Whenua Hou/Codfish Island. On the main islands, while the sites were chosen for seabirds, trigger species from other bird groups figure significantly, for example, sites for New Zealand Fairy Tern include New Zealand Dotterel; and Hutton's Shearwater include Kea. Similarly, sites for Black-fronted Tern and Black-billed Gull on rivers and in estuaries, lakes and lagoons include Wrybill, Black Stilt and Banded Dotterel (see following section – pages 18-21). In some of these cases the IBA boundaries were extended to include wetlands for Australasian Bittern.

Ahuriri River.
Photo: Frederic Pelsy

Black-fronted Tern.
Photo: Frederic Pelsy

Black-billed Gulls, Southland.
Photo: Rachel McClellan

Nesting Wrybill, Tasman River
Photo: Craig McKenzie

Braided River Systems – Ecosystems and Species in Crisis

A braided river is one that, over some part of its length, flows in multiple, mobile channels across a gravel floodplain. In New Zealand, many braided rivers remain relatively unmodified in terms of flows. However, the majority have very extensive encroachment by invasive weeds and all have exotic predators. Increasing demands for hydro-electricity generation, irrigation, gravel extraction and flood protection works are placing pressure on these systems.[10]

Braided rivers are characterised by highly unstable flows with high spring-summer peaks and rapid and frequent flooding, multiple and constantly changing channels, extensive areas of active shingle bars, and islands and wide beds (sometimes several kilometres wide). There are 307 rivers in New Zealand with braids on at least some of their sections. While these rivers can be found throughout much of the country, most are in the South Island. They support a diverse range of foraging and breeding habitats for a bird fauna of >80 species, some of which are threatened and highly adapted for living on these rivers. Specialist adaptations include a rapid, early breeding cycle compared to most other bird species, ability to renest quickly should they lose nests to natural perturbations in weather, and a variety of behavioural mechanisms to cope with river-breeding. Braided rivers in which the physical structure of the riverbed is still governed by natural processes are becoming rare in the developed world. New Zealand braided rivers remain relatively unmodified and support a diverse range of flora and fauna[11].

10 Gray, D., Harding, J.S. 2007. Braided river ecology: a literature review of physical habitats and aquatic invertebrate communities. *Science for Conservation 279*. Department of Conservation, Wellington. 50pp.

11 O'Donnell, C.F.J., Hoare, J.M. 2011. Meta-analysis of status and trends in breeding populations of black-fronted terns (*Chlidonias albostriatus*) 1962-2008. *New Zealand Journal of Ecology 35*: 30-43

Each river, while superficially similar to other rivers in the region, is sufficiently distinctive in its habitat characteristics to provide for a unique combination of wildlife.[12] The individual river systems complement each other and it was thought that their use by birds may change from one river to another, and year to year as conditions change. However, with habitat degradation continuing, particularly in the form of flow modification, predation and introduced weed encroachment, birds may lose versatility of habitat choice.[13]

The IBA process recognises the values of those river ecosystems where threatened species are known to occur regularly, as well as significant populations of other species (ie. >1% of global populations). The guild of braided river specialists includes Black-fronted Tern, and Black-billed Gull, as well as Black Stilt, Wrybill, Banded Dotterel, South Island Pied Oystercatcher and Pied Stilt.

BREEDING SITES

Black-fronted Terns breed only on the braided riverbeds of the eastern and southern South Island, from Marlborough to Southland. After breeding, birds disperse to coastal areas, roosting in sheltered harbours, estuaries and lagoons, foraging mostly offshore but also on near-coastal farmland.[14]

Black-billed Gulls are strongly colonial and breed predominantly on gravel-bedded rivers from the coast to the headwaters. The species is found throughout New Zealand but is most common east of the southern divide in the South Island. Black-billed gulls have recently extended their breeding range in the North Island. Nationwide surveys (1995-1997) indicated that approximately 70% of the species nested within Southland, approximately 25% in Otago, Canterbury and Marlborough, and the remaining population in the North Island.[15]

Wrybills breed exclusively on braided riverbeds where they nest on bare shingle flats. The large majority of the population breeds in Canterbury, with a small number in Otago.[16]

Black Stilt are by far the rarest species in this guild, numbering just over 100 individuals but with only a few breeding pairs (the entire population) left in the upper Waitaki Basin. They rarely attempt breeding elsewhere in Canterbury.[17]

Banded Dotterels breed only in New Zealand although some migrate to Australia. While breeding birds in the North Island are largely confined to coastal areas (an exception are those birds breeding on the tephra slopes of the Central Volcanic Plateau), much larger numbers are found in the south in both coastal and inland areas. Braided rivers are a primary breeding habitat for the species where it is the most common wader.

South Island Pied Oystercatchers breed mostly east of the Southern Alps on riverbeds and farmland, and high-country grasslands.[18]

Pied Stilts live in all kinds of wetlands from brackish estuaries to freshwater lakes, swamps and braided rivers. They build their nests near water, often in a damp situation.[19]

12 O'Donnell, C.J.F., Moore, S.M. 1983. *The wildlife and conservation of braided river systems in Canterbury. Fauna Survey Unit Report 33.* Wildlife Service, Department of Internal Affairs, Wellington. 73pp.
13 O'Donnell, C.F.J. 2000. *Significance of river and open water habitats in Canterbury for indigenous birds. Environment Canterbury Report UOOl37.* 55pp.
14 Bell, M. 2013. Black-fronted tern. In Miskelly, C.M. (ed.) *New Zealand Birds Online.* www.nzbirdsonline.org.nz
15 McClellan, R.K. 2009. The ecology and management of Southland's black-billed gulls. Unpublished PhD thesis, University of Otago, Dunedin, New Zealand. 264pp.
16 Dowding, J.E. 2013. Wrybill. In Miskelly, C.M. (ed.) *New Zealand Birds Online.* www.nzbirdsonline.org.nz
17 O'Donnell, C.F.J. 2000. *Significance of river and open water habitats in Canterbury for indigenous birds. Environment Canterbury Report* UOOl37. 55pp.
18 Sagar, P.M. 2013. South Island pied oystercatcher In Miskelly, C.M. (ed) *New Zealand Birds Online.* www.nzbirdsonline.org.nz
19 Adams, R. 2013. Pied stilt. In Miskelly, C.M. (ed) *New Zealand Birds Online.* www.nzbirdsonline.org.nz

FEEDING AND FORAGING

- Aerial foraging by Black-fronted Terns (ie. hawking flying insects in the air, or dipping into the water and retrieving insects in the drift) and the flow and number of braided channels influence foraging activity.[20] Black-billed Gulls can forage en masse over rivers and beech forest, on occasion hundreds of metres up, feeding on moths and other flying insects.[21]
- Black-billed Gulls also have been observed foraging widely across rural land adjacent to rivers where they breed, especially associated with freshly ploughed fields. Because of a higher rainfall in Southland the pattern of foraging apparent there may be different from other drier areas of the South Island. This pattern may change with the rapid rise of pasture irrigation in those areas with the shift from sheep or crops to dairy farming.
- During breeding Black-fronted Terns can also occasionally feed on farmland, <5 % of birds. However, at this time of year they have a very strong association with aquatic habitats, and terrestrial foraging is more a non-breeding activity or something that happens during floods.[22]
- Wrybills are specialised for foraging in shallow riffles and runs of braided rivers.[23]
- Black Stilts are highly dependent on shallow channels on braided rivers for both breeding and feeding, and on the shallow margins of lakes and ponds in winter.

SEASONAL DISTRIBUTION

Braided river specialists breed much earlier than many bird species.[24] Oystercatchers arrive back on riverbeds as early as July, and commence breeding in August. The earliest Wrybills return by mid-August. All riverbed waders, terns and gulls are breeding by mid-September. By the beginning of December, the majority have completed nesting, and in many cases have finished raising their young. Then the majority migrate to the coast where they take advantage of productive food supplies that enable them to prepare for longer migrations and store fat for the winter. Wrybills and South Island Pied Oystercatchers will migrate to northern New Zealand. Some birds, however, remain resident inland. The most notable example is the Black Stilt. Most Black-billed Gulls remain inland in Southland following breeding.

THREATS

Declines are occurring among the bird species on braided rivers of New Zealand and result from an interaction of threats on braided rivers, particularly loss of habitat and direct predation by introduced mammals.[25,26] Significant reduction in river flows, through abstraction for irrigation and diversion or impoundment for hydroelectric power generation, may be reducing foraging habitat availability and increasing the accessibility of breeding colonies to introduced predators, leading to reduced productivity and survival. In addition, reduction in flows is thought to facilitate increased weed invasion of nesting habitats, making these habitats unavailable. Furthermore, natural flood events, disturbance by people and livestock, as well as outright persecution contribute to a disturbing picture of ecosystems and species in crisis.

20 O'Donnell, C.F.J., Sedgeley, J.A., Westbrooke, I. 2006. *Habitat use by black-fronted terns* (Sterna albostriata) *on the Wairau River, New Zealand*. Department of Conservation, Christchurch. 19pp.

21 R. McClellan, C. Gaskin (pers. comm.)

22 O'Donnell, C.F.J., Sedgeley, J.A., Westbrooke, I. 2006. *Habitat use by black-fronted terns (Sterna albostriata) on the Wairau River, New Zealand*. Department of Conservation, Christchurch. 19pp.

23 Hughey, K.F.D. 1997. The diet of the wrybill (*Anarynchus frontalis*) and the banded dotterel (*Charadrius bicinctus*) on two braided rivers in Canterbury, New Zealand. *Notornis 44*: 185-193

24 O'Donnell, C.J.F., Moore, S.M. 1983. *The wildlife and conservation of braided river systems in Canterbury. Fauna Survey Unit Report 33*. Wildlife Service, Department of Internal Affairs, Wellington. 73pp.

25 Keedwell, R. 2005. Breeding biology of black-fronted terns (*Sterna albostriata*) and the effects of predation. *Emu 105*: 39-47

26 O'Donnell, C.F.J. 2000. *Significance of river and open water habitats in Canterbury for indigenous birds. Environment Canterbury Report UOOl37*. 55pp.

Spotted Shags, Ashburton River. Photo: Andrew Crossland

Right: NZ Fairy Tern. Photo: Frederic Pelsy

CATCHMENT MOSAICS

As the IBA programme moves beyond identifying areas primarily for seabirds, and expands to take account of other bird groups, significant areas within a number of river catchments will be added to the IBA network. For example, Blue Duck is a torrent specialist and threatened species. The headwaters and tributaries it inhabits will be added to the New Zealand IBA network as separate IBAs, unless there is significant overlap with foraging of Black-fronted Tern in which case an existing IBA will be extended. Forest areas adjacent to rivers are important to the health of rivers. Those that meet the IBA criteria will also become IBAs. Already, a number of estuaries and lagoon areas at the mouths of some rivers have also been identified as IBAs under the current project (eg. Wairau Lagoons, Ashley Estuary, Oreti Estuary). Eventually a good number of our valuable catchments will be captured by a mosaic of IBAs (eg. Eglington, Waimakariri and Buller Rivers). Some significant wetland areas associated with braided river systems will be included in the IBAs identified through the current project, for example, Ahuriri Delta (Ahuriri River IBA), Rakatu Wetlands (Wairau River IBA).

River-Mouths, Estuaries, Harbours and Lagoon Areas

Throughout New Zealand river-mouths, harbours and estuaries are important areas for seabirds: for some they provide valuable breeding sites (eg. NZ Fairy Tern, Black-billed and Red-billed Gulls, Pied and Little Shags), for others they provide important staging or roosting sites post-breeding (eg. Black-fronted Tern, Spotted Shag).

Wetland Areas

The IBA project to date covers wetland areas and those estuaries, lagoons and harbours where seabirds that trigger IBA status breed. Swamp specialists such as rails (eg. Marsh (Baillon's) Crake, Spotless Crake and Pukeko) and Australasian Bittern dwell in dense swamp vegetation associated with these wetlands. In northern New Zealand Banded Rail favour wetland fringes to harbours and estuaries, including mangrove forests. A number of the IBAs identified to date will include areas where these birds occur (eg. Kaipara Harbour IBA, Firth of Thames IBA, Farewell Spit IBA, Te Waihora IBA, Matuara Waituna Fortrose IBA).

The endangered Australasian Bittern occurs in New Zealand, Australia and several offshore islands and are specialist wetland birds requiring emergent vegetation for foraging. They roost and breed in wetlands that have a productive food supply. In the last thirty years the species numbers have declined markedly throughout much of the birds' range. This decline mirrors the loss of its habitat.[27]

27 Langlands, P. 2013. *Current status of the Australasian bittern (*Botaurus poiciloptilus*) in Canterbury). Report No. R13/25.* Environment Canterbury, Christchurch. 32pp.

Marine Important Bird Areas

Given the long periods that seabirds spend at sea, the multiple threats they face there and the vast distances they cover, identifying a network of priority sites for their conservation in the marine environment is critical to ensure their future survival. Determining seabird high-use areas and the identification of marine IBAs will make a vital contribution to initiatives to gain greater protection. This will include valuable input to the identification of Marine Protected Areas and will also contribute to efforts to ensure sustainable management of resources within New Zealand's EEZ. The identification of marine IBAs globally has necessitated a significant amount of effort to source, collate and analyse bird distribution data in order to be able to locate sites and develop site boundaries in often apparently featureless seascapes.

GLOBAL CRITERIA FOR MARINE IBAS

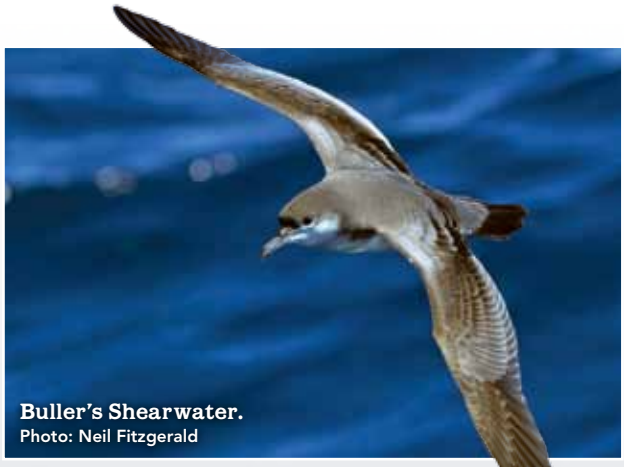
So far only two of the global IBA criteria have been applied in the marine environment:

A1 Regular presence of threatened species

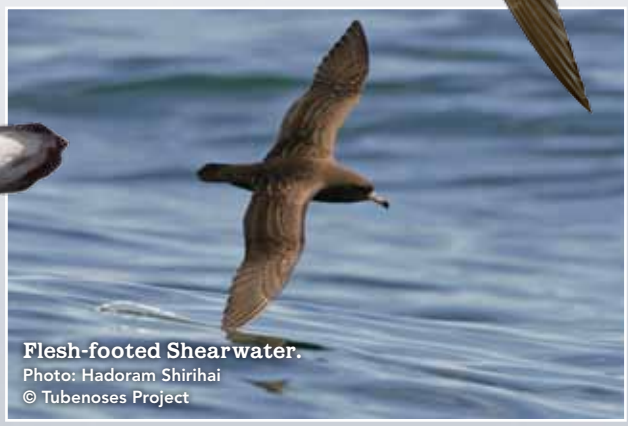
A4 More than 1% of global population regularly occurring.

There are four aspects of the annual cycles of seabirds where they are most likely to occur in IBA threshold numbers. These are:

1. Seaward extensions to breeding colonies
2. Coastal congregations of non-breeding seabirds
3. Migration hotspots and pathways
4. Important areas for pelagic species.



Buller's Shearwater.
Photo: Neil Fitzgerald



Flesh-footed Shearwater.
Photo: Hadoram Shirihai
© Tubenoses Project

Black-bellied Storm Petrel, Pukaki Rise.
Photo: Karen Baird

NZ White-capped Albatross.
Photo: Abe Borker

Seaward Extensions

Seaward extensions to breeding colonies provide one method for marine IBA identification. While many seabird breeding colonies have already been identified as IBAs, their boundaries have been, in almost all cases, confined to the land on which the colonies are located. The boundaries of these sites can, in many cases, be extended to include those parts of the marine environment which are used by the colony for feeding, maintenance behaviours and social interactions. Such extensions are limited by the foraging range, depth and/or habitat preferences of the species concerned. The seaward boundary is, as far as possible, colony and/or species-specific, based on known or estimated foraging and maintenance behaviour.

The BirdLife Seabird Foraging Range Database includes published information on the foraging distances, preferences and behaviours of (primarily coastal) seabirds while breeding. At-sea data have been used elsewhere in the world to define the likely boundaries of key foraging and rafting areas adjacent to seabird breeding colonies, which can be included as marine IBAs. However, few New Zealand breeding species are in the foraging range database.

To identify New Zealand marine IBAs in coastal and continental shelf areas, surrogates have been drawn from the database. In addition, expert opinion has been used to provide 'provisional choices' for foraging distances to draft provisional boundaries for seaward extensions to colonies. This review also draws on published and unpublished data including foraging ranges, dive depth limits for some species, and bathymetry. As new tracking data becomes available, these areas will be further refined, or, in some species, eg. Buller's, Fluttering and Hutton's Shearwaters, used to create separate marine IBAs in pelagic areas as more is known about their distribution during various stages of their breeding cycles.

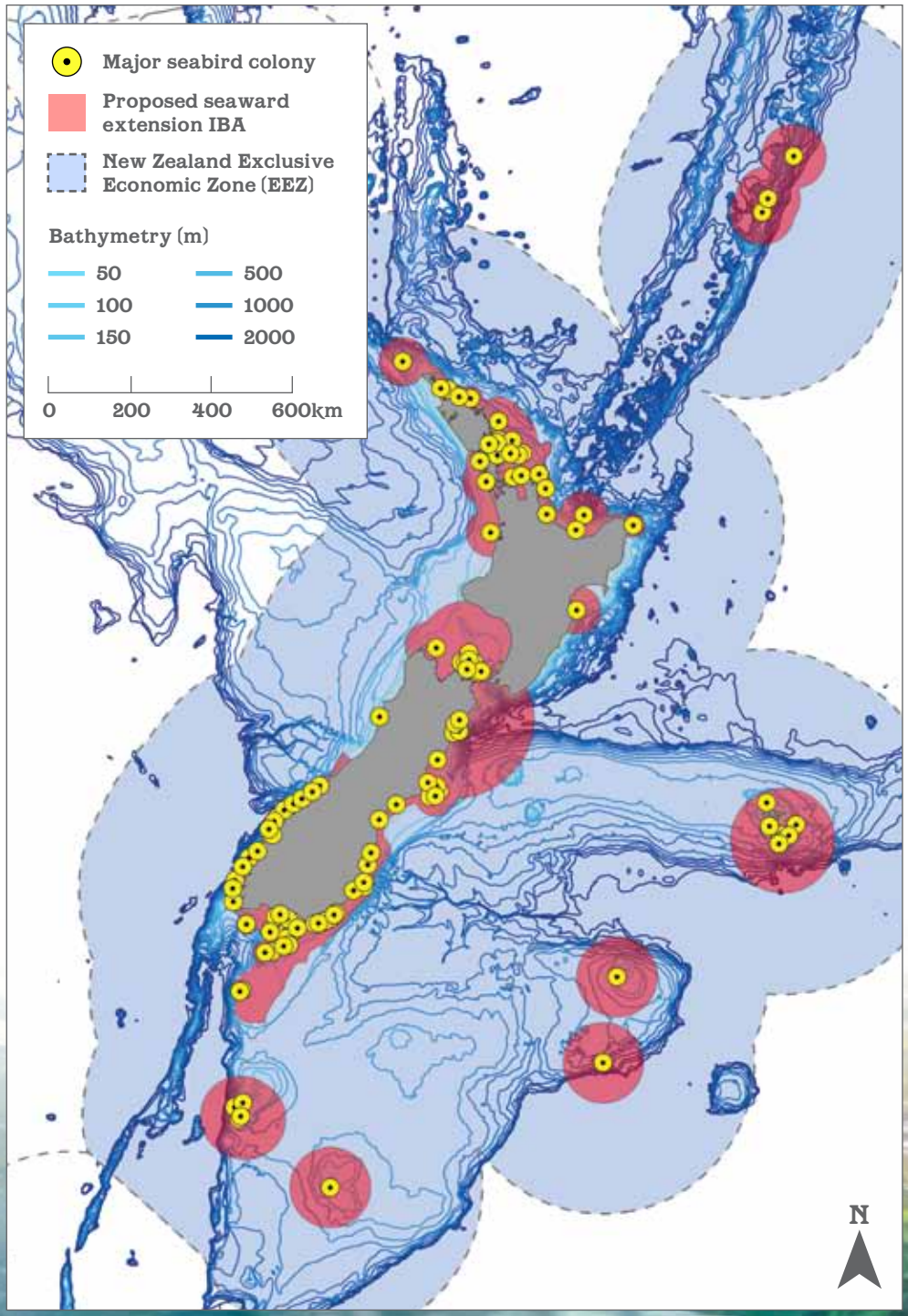
It is important to note that seaward extensions, particularly around islands, also capture the passage of pelagic species to and from colonies, and congregations close to breeding islands (eg. Cook's Petrel, Buller's and Sooty Shearwaters). In some areas (eg. Kermadec Islands) foraging by pelagic species can be very close to colonies (ie. White-naped (White-necked) and Black-winged Petrels, Wedge-tailed Shearwater). In the case of Cook Strait or stretches of coastline, the movement through bottleneck areas will also be captured.

Bounty Island Shag.
Photo: Hadoram Shirihai
© Tubenoses Project

Fiordland Penguins.
Photo: Hadoram Shirihai
© Tubenoses Project

Buller's and Fluttering Shearwaters. Photo: Jon Irvine

Northern Royal Albatrosses. Photo: Frederic Pelsy



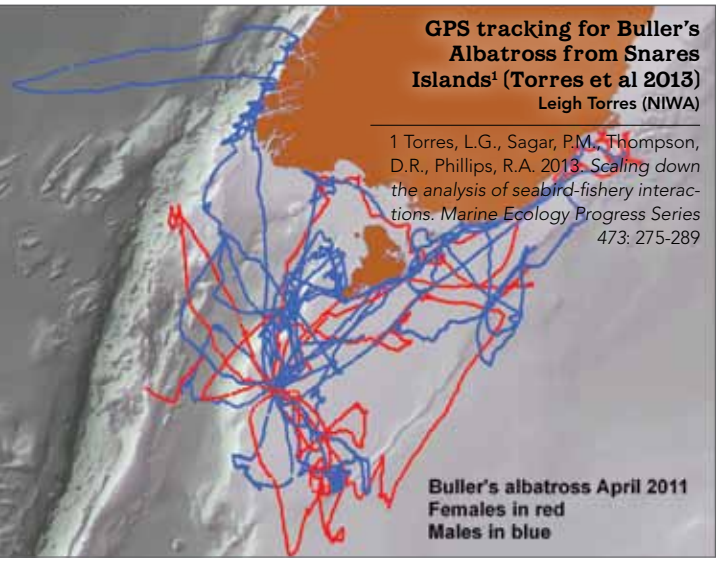
Snares Crested Penguins diving through bull kelp, Snares Islands. Photo: Kim Westerskov

Identifying Marine IBAs for Pelagic Seabirds – Work in Progress

Areas for pelagic species are those marine areas remote from land where they regularly gather in large numbers, whether to feed or for other purposes. These areas usually coincide with specific oceanographic features, such as shelf-breaks, eddies, upwellings and convergence zones, and their biological productivity is invariably high.

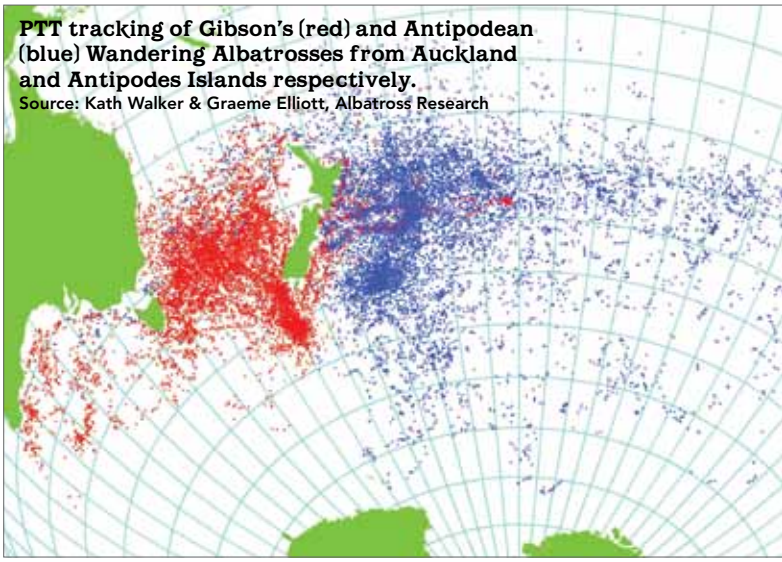
BirdLife's *Tracking Ocean Wanderers: global seabird tracking database* comprises extensive data on distributions of seabirds at sea (originally for Procellariiformes – albatrosses and petrels), but more recently to include other seabirds collected from tracking devices deployed by research scientists. This database has proved to be a vital resource for the identification of marine IBAs relating to non-breeding congregations, migratory bottlenecks and at-sea areas for pelagic species. The development of novel techniques for the analysis of data, particularly those from tracking devices, has involved input from a wide range of seabird experts.

Global Positioning System (GPS) tags that provide fine-scale data-accurate points (to within metres) with reporting frequencies up to every second are increasingly used as devices become smaller and more efficient with battery life. Satellite tags (PTT) provide meso-scale data – regularly receiving position fixes (up to hourly) from a network of satellites for periods of months or even years, and are accurate to between 1 and 25 km. Geolocator (GLS) tags provide large-scale data – one point every 12 hours with a battery life that can extend up to 5 years. Their small size makes them applicable to all but the smallest seabirds and they provide locations that are accurate to roughly 180 km.



GPS tracking for Buller's Albatross from Snares Islands[1] (Torres et al 2013)
Leigh Torres (NIWA)

1 Torres, L.G., Sagar, P.M., Thompson, D.R., Phillips, R.A. 2013. *Scaling down the analysis of seabird-fishery interactions. Marine Ecology Progress Series 473*: 275-289

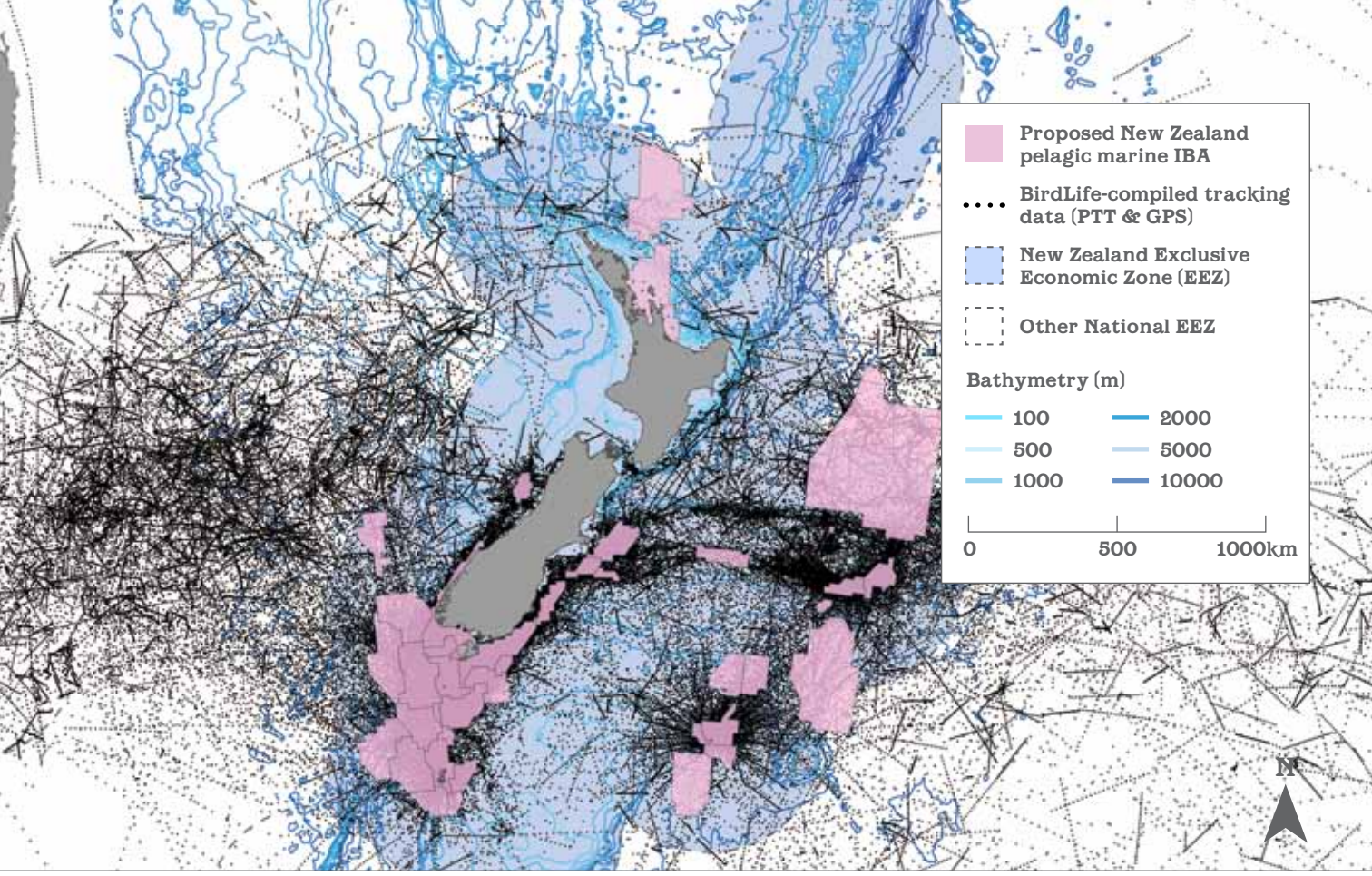


PTT tracking of Gibson's (red) and Antipodean (blue) Wandering Albatrosses from Auckland and Antipodes Islands respectively.
Source: Kath Walker & Graeme Elliott, Albatross Research

Fitting GPS tag to Australasian Gannet, Mahuki Island, Hauraki Gulf. Photo: Matt Rayner

Geolocator on a Black-winged Petrel's leg.
Photo: Stefanie Ismar

Fitting GPS tag to a Buller's Albatross, Snares Islands.
Photo: Leigh Torres (NIWA)



Work in progress. Map showing marine IBA identified for pelagic areas (purple areas) together with tracking from GPS and PTT data held in BirdLife's *Tracking Ocean Wanderers: global seabird tracking database*. The map does not include GLS data. GPS and PTT data were used in combination with GLS tracking to identify the pelagic mIBAs shown during BirdLife's preliminary marine IBA analyses at the global level. The steady increase in tracking projects continues to yield more data. Reanalyses of the augmented New Zealand tracking dataset will identify more IBA sites. Map source: BirdLife International. GPS and PTT data providers: L. Deppe, G. Elliot, A. Freeman, D. Nicholls, C. Robertson, P. Sagar, P. Scofield, J-C. Stahl, A. Suzuki, L. Torres, D. Thompson, K. Walker, S. Waugh.

The whole New Zealand EEZ is a globally important area for seabirds. There is a bewildering array of layers that seabirds utilise spatially and temporally. Foraging areas change through different stages of breeding. Most birds breed annually, some biennially, and at different times of the year. They can remain in New Zealand waters all year round, or migrate away for short or long periods. To date (February 2014) tracking data for only 17 species of New Zealand's albatrosses and petrels has been entered into the *Tracking Ocean Wanderers: global seabirds tracking database* – http://www.seabirdtracking.org/. While this is an area of seabird research that is proliferating, the coverage of both species and study sites (ie. colonies where birds are tracked from) remains patchy. The resulting analysis for marine IBA purposes is in a formative state. Yet despite this, the picture that is emerging of how seabirds use New Zealand's marine environment from the tracking studies (combined with other data) is a complex one.

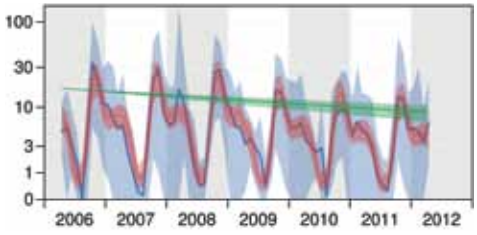
From a conservation perspective, identifying a network of priority sites for their conservation is also a challenge but vital to ensure their future survival. BirdLife's Marine e-atlas, launched in 2012, is the first global inventory of these sites (http://maps.birdlife.org/marineIBAs/default.html). Marine IBAs must be seen as a living process. As new data is added to the tracking database, this will result in new areas being defined, with some existing areas modified. Researchers are urged to continue submitting datasets to the *Tracking Ocean Wanderers: global seabirds tracking database*, including non-Procellariiform tracking datasets (ie. penguins, gannets, boobies, shags (cormorants), gulls and terns).

Seabird observers in northern New Zealand waters. Photo: Karen Baird

Other Data

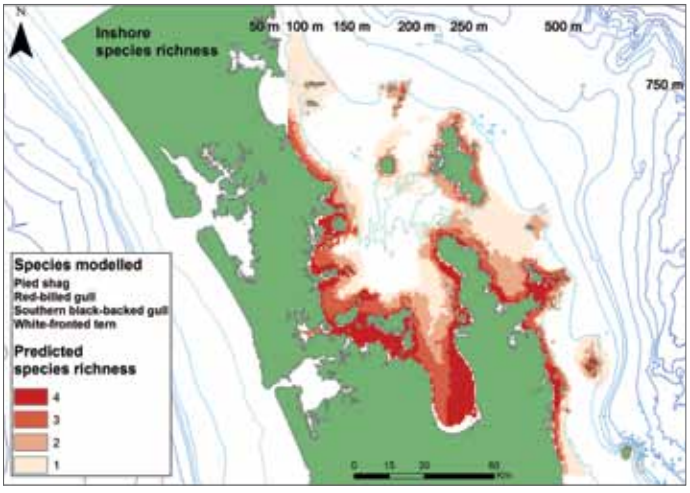
A variety of other data have been utilised for marine IBA identification including:

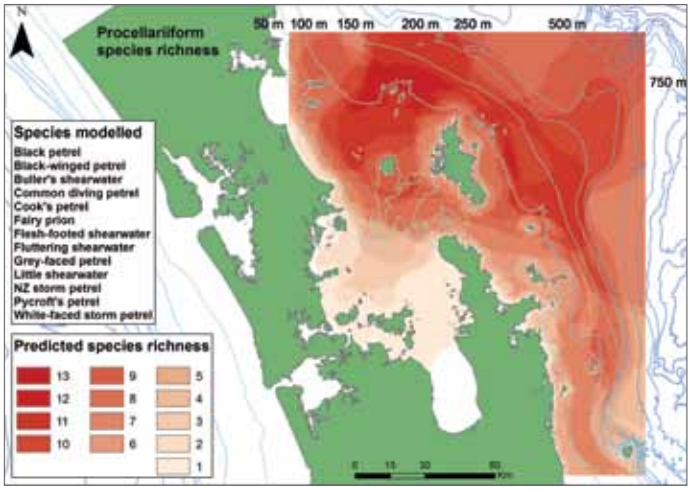
AT-SEA OBSERVATIONS



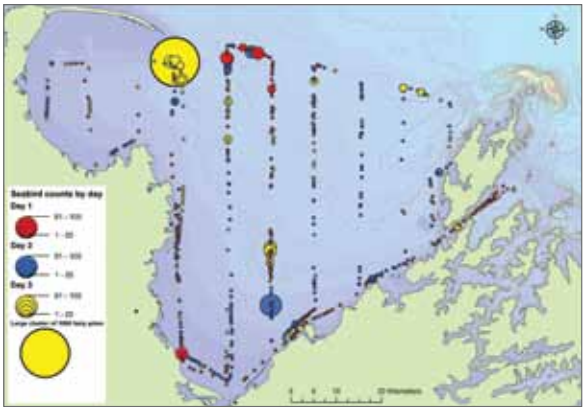
Number of Westland Petrels recorded during pelagic tours, Kaikoura (2006-2012). Source: Dragonfly Science/Encounter Kaikoura

Understanding the importance to seabirds of the waters of New Zealand's EEZ requires knowledge of species diversity across a dynamic marine ecosystem from estuaries and harbours, to coastal waters, deeper shelf waters, to the edge of the continental shelf and deep pelagic waters far from land. Historically this understanding has been gained from boat-based observations of where birds congregate to feed at sea. In New Zealand waters the data sources for ship-based seabird observations are those made by J. Jenkins during inter-island (Pacific) and trans-Tasman voyages as master aboard Union Steam Ship Company vessels (Auckland Museum); sightings data collected by Kaikoura Encounter (Ocean Wings) skippers; by others during seabird bird-watching and research trips; and more latterly e-Bird entries and postings to BirdingNZ.net and Seabird-News internet groups. Further sightings have been made during aerial surveys; also by fisheries observers (counts of seabirds seen around vessels and from captures in long-line and trawl fisheries). To date (2014) there has not been an official attempt to centralise and standardise this data.





Predicted species richness modelling for 19 Hauraki Gulf breeding seabird species from at-sea observations. From: Miller, M.G.R., Gaskin, C.P. (unpubl.). Hauraki Gulf Seabird Modelling Report, prepared for Hauraki Gulf Spatial Planning. Waikato Regional Council.



Location and counts of all seabirds recorded by day during aerial survey in Golden and Tasman Bay, 22-24 November, 2010 (Handley et al 2011).

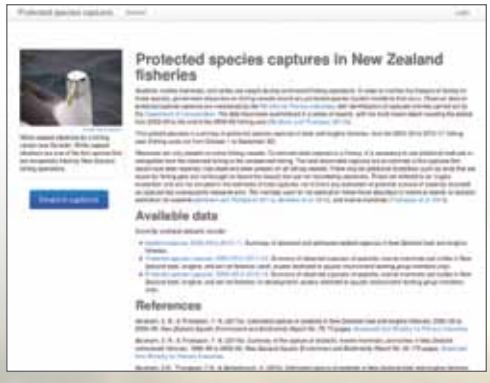
AERIAL SURVEYS

A number of aerial surveys have been conducted in New Zealand waters, mainly for purposes other than surveying seabirds (ie. marine mammals, basking sharks, fish congregations). However, all contain records of seabirds seen. Two surveys resulted in publications, one for Banks Peninsula,[28] and the other for Tasman Bay and Golden Bay.[29]

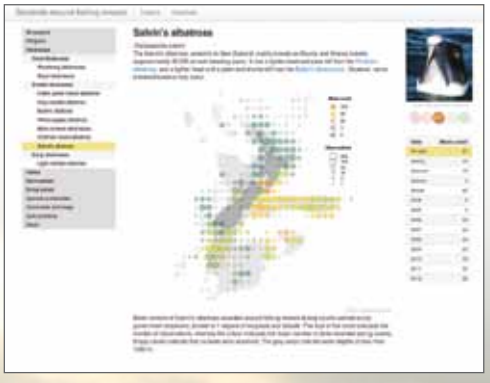
FISHERIES NEW ZEALAND SEABIRD COUNTS

Since 2004 observers on fishing vessels have been carrying out regular counts of the numbers of seabirds. The aim is to allow the interactions between seabirds and fishing vessels to be better understood, and in turn to help manage fisheries to reduce seabird by-catch. Link to website: http://data.dragonfly.co.nz/seabird-counts/

Fisheries observer data on the capture of seabirds in New Zealand trawl and longline fisheries from 2002-03 to 2010-11 recently have been made available through a web interface. This website was developed by Dragonfly Science for the Ministry for Primary Industries and is searchable by year, species, region and fishing method, with results displayed in a clear graphical format. The data have also been provided and can be exported for those who want to analyse it themselves, or who want to use the data for other purposes. Link to website: http://data.dragonfly.co.nz/psc/



Protected species captures in New Zealand Fisheries website, Salvin's Albatross. Home page: http://data.dragonfly.co.nz/psc/ MPI/Dragonfly Science



Seabird counts around fishing vessels website home page, http://data.dragonfly.co.nz/seabird-counts/ DOC/Dragonfly Science

28 Hawke, D.J. 1998. Seabirds around Banks Peninsula (New Zealand) from aerial surveys. *Notornis* 45: 113-125

29 Handley, S., Sagar, P., Schuckard, R. 2011. Seabird, marine mammal and surface-fish surveys of Tasman and Golden Bay, Nelson: Stable isotopes, aerial and boat surveys. Report prepared for Friends of Nelson Haven and Tasman Bay Incorporated and AWE New Zealand Pty. Ltd.

Fishing vessel and seabirds, Chatham Rise. Photo: Karen Baird

Breaksea Island and Sound, Fiordland. Photo: Neville Peat

IBAs – Tools for Conservation

In the future, just as in the past, changes in public attitudes will be essential for changes in environmental practices.[30] Increasing awareness of seabirds, appreciating their diversity, understanding their lives and the threats they face, requires advocacy and education. A key value of the global IBA programme is that New Zealand's seabird species and local sites are seen in a truly international context.

Protecting seabirds is a major challenge, given New Zealand's high seabird diversity and the large number of globally threatened species living in remote, mostly uninhabited places scattered throughout a long archipelago. For a country with the world's fourth largest EEZ and a relatively small population (ie. 4.4 million people) this is especially difficult in terms of logistics (ie. getting to where they breed), funding and people resourcing.

The IBA programme's site-based approach presents a mosaic of locally identifiable sites that meet global criteria. Taken as a whole, the network provides a comprehensive overview of New Zealand's seabirds, including a greater understanding of seabird distribution, temporally and spatially – on land (breeding sites/colonies, moult and roosts) and at sea. Taken individually, or in regional sets, government agencies with environmental responsibilities, tangata whenua, non-governmental organisations, business, community groups and individuals can work together to ensure conservation values are retained.

New Zealand is a world leader of eradication programmes, translocations, and successful agency/community-based projects. The country has turned a shocking record of extinctions and habitat loss around, with seabirds the beneficiary of many of these programmes. But seabirds are increasingly at risk at sea as well and we must turn our attention to protection throughout their habitats and their lives.

The IBA programme will help seabird conservation management by providing:

1. A gap analysis. Our knowledge of New Zealand's seabird populations is in the main poor. Certainly New Zealand's remote places are challenging environments for surveying seabirds. However, in these places some albatross and large petrel species – ie. species covered by the Agreement for the Conservation of Albatross and Petrels (ACAP) – are given priority and their monitoring reflects this. Also, critically endangered species such as the Chatham Island Taiko and NZ Fairy Tern are in such small numbers that their breeding sites are reasonably well known. However, there are many sites less remote and close to population centres for which our information of seabird populations remains inadequate, embarrassingly so for a country that prides itself as the "Seabird Capital of the World".

30 Roberts, C.M. 2007. *The unnatural history of the sea*. Shearwater Books, Island Press, Washington DC. 146pp.

2. Education and advocacy resources. The information generated for the project to date, including this document, can be used to showcase the importance of birds, especially seabirds. Forest & Bird's response to Greenpeace oil spill modelling is an example where information can be used for a specific purpose (http://www.forestandbird.org.nz/files/file/Fact%20File_GPNZ%20Oil%20Trajectory%20Analysis_FB%20response.pdf).
3. Advocacy support for greater participation from agencies, tangata whenua, community groups (including restoration and supporters groups/trusts), business and landowners.
4. Support for existing agency actions, for example: National Plan of Action for Seabirds (NPOA-Seabirds); DOC's Conservation Services Programme (CSP); Project River Recovery; Hauraki Gulf Spatial Planning. Also, DOC's Conservation Management Strategy (CMS) reviews.
5. DOC's formerly active recovery programmes for threatened bird species have been under review (December 2013). The IBA network can support future measures and provide focus for partnerships to be developed with organisations involved in managing habitats supporting threatened species.
6. Support for tangata whenua through highlighting global values for sites and species that are taonga to individual iwi and hapu.
7. Support for existing community and supporters groups through the IBA status as globally important sites, and to assist with prioritisation of resources. There are many groups active throughout New Zealand, for example: Hauturu Little Barrier Supporters Trust, Miranda Shorebird Trust, Cape Sanctuary, Wairarapa Moana, Friends of Nelson Haven and Tasman Bay, Te Korowai Trust (Kaikoura), Hutton's Shearwater Charitable Trust, Banks Peninsula Trust, Ashley-Rakahuri Rivercare Group, Te Waihora Ellesmere, BRaid, Otago Peninsula Trust, Southland Ecological Restoration Network, West Coast Penguin Trust and Chatham Island Taiko Trust. However, there are many parts of the country identified as IBAs for which there are no such support groups.
8. Identification of areas for developers to avoid or mitigate their impacts, and potentially where to invest in offsets.

Hutton's Shearwater project, Ka Whata Tu o Rakihouia/ Seaward Kaikoura Range. Banding shearwaters and one of the Kowhai Stream colony sites, Seaward Kaikoura Range.
Photos: DOC, Hutton's Shearwater Charitable Trust

Aerial poison drop, Macauley Island, Kermadec Islands. Photo: Peter Dilks, DOC

Campbell Albatross research, Campbell Island. Photo: Henk Haazen

9. Prioritisation of control measures (eg. predator, pest and weed control programmes). Forest & Bird is part of the Predator Free New Zealand campaign, which would have enormous benefits for seabird populations as well as other native birds. Removal of predators from some of our largest islands as a first step will also have huge benefits – eg. Black Petrel on Aotea (Great Barrier Island) and the potential for recovery of southern populations of seabirds on Rakiura (Stewart Island) such as Cook's and Mottled Petrels, prions and storm petrels.
10. Threat mapping. Data gathered of seabird distribution can be plotted against both known and potential threats in regional and national spatial planning.
11. Support for research programmes by emphasising the global context of many of New Zealand's seabirds, their breeding sites and foraging areas. New Zealand should be recognised as a key seabird laboratory, a world centre for seabird research.
12. Seabird research and conservation in New Zealand. On-going, long-term and well-funded, the world is watching us. Increasing and re-prioritising within the conservation vote are avenues that a small nation can pursue, but there is room for the development of large-scale internationally funded schemes within New Zealand.

CONSERVATION MANAGEMENT OF SEABIRD SITES [31]

Fossil records indicate that mainland New Zealand was once populated by an abundance of seabirds.[32] With the arrival of humans and their associated predators, seabirds were largely eliminated from the mainland and are now restricted to predator-free offshore islands.[33] Seabirds have evolved in the absence of ground-based predators, so

31 Text provided by Rachel Buxton, University of Otago.
32 Holdaway, R.N., Worthy, T. H. & Tennyson, A. 2001. A working list of breeding bird species of the New Zealand region at first human contact. *New Zealand Journal of Ecology 28*: 119-187.
33 Towns, D.R., Ballantine, W.J. 1993. Conservation and restoration of New Zealand island ecosystems. *Trends in Ecology & Evolution 8*: 452-457.

their populations are often decimated when mammals are introduced.

More recently, New Zealand has become a world leader in the development of island restoration techniques – namely the removal of introduced predators. To date, all predators have been removed from over 90 islands around the archipelago, representing over 30,000 ha of newly predator-free habitat.[34,35]

After predator removal, the restoration of seabird populations can be passive, where populations are left to grow or re-colonise naturally, or active, where recovery is manipulated by conservation managers. Considering many seabird species do not begin to breed until 5+ years of age, lay one egg a year, sometimes skip breeding if conditions are not favourable, and often return to their natal site to breed, passive restoration can be a slow process. Research suggests that passive restoration is more likely to be successful on islands with a nearby source colony.[36] On islands where seabird populations are unlikely to recover naturally, several active restoration techniques have been developed. These include translocation, where chicks are transferred from their natal site to a restoration site, and social attraction, where birds are lured to a site using artificial social cues, such as call playback and decoys.[37]

34 Clout, M., Russell, J.C. 2006. The eradication of introduced mammals from New Zealand islands. Pages 127-141 in *Assessment and Control of Biological Invasion Risks* (F. Koike, M. Clout, M. Kawamichi, M. De Poorter, and K. Iwatsuki, Eds.). IUCN and Shoukadoh Book Sellers, Gland, Switzerland and Kyoto, Japan.

35 Towns, D.R. 2011. Eradication of vertebrate pests from islands around New Zealand: what have we delivered and what have we learned? In *Island invasives: eradication and management* (C.R. Veitch, M. Clout, and D.R. Towns, Eds.). IUCN, Gland, Switzerland.

36 Buxton, R.T., Jones, C.J., Moller, H., Towns, D.R. in press. Drivers of seabird population recovery on New Zealand islands after predator eradication. *Conservation Biology*.

37 Jones, H.P., Kress, S.W. 2012. A review of the world's active restoration projects. *The Journal of Wildlife Management 76*: 2-9.

Fluttering Shearwaters attracted to acoustic system, Tawharanui Open Sanctuary. Photo: TOSSI

Installing artificial burrows for Fluttering Shearwater translocation, Mana Island.
Photo: David Cornick

Monitoring [38]

An integral part of any conservation management programme is monitoring. Not only does monitoring estimate the success of conservation actions, it can also discover trends which may assist in better planning of future conservation management. However, monitoring of New Zealand's seabirds is especially challenging for many reasons: offshore, predator-free islands are hard and expensive to reach; over 40% of seabird species are nocturnal and burrow-nesting, making conventional monitoring techniques problematic; and the density of seabird colonies makes it difficult for researchers to avoid damaging and disrupting nests. Many innovative techniques have been created to overcome these challenges. New technology has allowed researchers to monitor the relative number of breeding birds remotely using automated acoustic and visual recording.[39,40] Furthermore, with the advent of small infra-red cameras (burrowscopes), complex multi-variate modelling, and GIS, population census of seabirds has become more accurate and repeatable.[41,42]

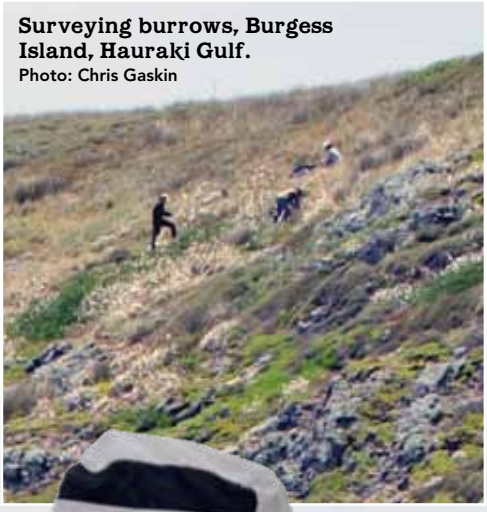
38 Text provided by Rachel Buxton, University of Otago.

39 Buxton, R.T., Jones, I.L. 2012. Measuring nocturnal seabird activity and status using acoustic recording devices: applications for island restoration. *Journal of Field Ornithology 83*:47-60

40 Huffeldt, N.P., Merkel, F.R. 2013. Remote time-lapse photography as a monitoring tool for colonial breeding seabirds: a case study using Thick-billed Murres (Uria lomvia). *Waterbirds 36*:330-341

41 Rayner, M.J., Clout, M., Stamp, R.K., Imber, M., Brunton, D.H., Hauber, M.E. 2007. Predictive habitat modelling for the population census of a burrowing seabird: a study of the endangered Cook's petrel. *Biological Conservation 138*: 235-247

42 Whitehead, A., Lyver, P.O.B., Jones, C.J., Macleod, C., Bellingham, P.J., Coleman, M., Karl, B.J., Drew, K., Pairman, D., Gormley, A.M., Duncan, R.P. 2014. Re-establishment of customary seabird harvest using predictive habitat models to estimate breeding-pair population sizes. *Biological Conservation 169*:106-116



Surveying burrows, Burgess Island, Hauraki Gulf.
Photo: Chris Gaskin

Installing remote recording devices, Te Hauturu-o-Toi/ Little Barrier Island.
Photo: Chris Gaskin

Surveying Black-billed Gulls, Canterbury.
Photo: Ashley-Rakahuri Rivercare Group

Checking band numbers on nesting Grey-headed Albatrosses, Campbell Island.
Photo: Joy Sagar

Helping IBA Conservation and Monitoring

Forest & Bird and Birds New Zealand (OSNZ) encourage you to help monitor and conserve IBAs.

To help, you can:

- Publicise: share this report and the supplementary documents with friends and colleagues; become familiar with the online IBA resources and send the links to interested people.
- Champion: publicise the value of your IBA to local people and government; talk to your community – to neighbours, friends, schools or special interest groups.
- Join a team: join or create a local IBA support group or a larger regional group.
- Observe and monitor an IBA; volunteer to monitor an IBA.
- Practical conservation: volunteer for pest control and revegetation projects in an IBA.
- Climate consciousness: reduce your carbon footprint.
- Sponsor: donate to Forest & Bird, OSNZ or a local support group.
- Politics: campaign and vote for conservation.
- Adopt an IBA.

THE ROLE OF COMMUNITY (CITIZEN) SCIENCE

There's nothing mysterious about science. Any intelligent and committed person can become involved. Driven by curiosity, by the need to know, science is a deeply human activity and, as such, is not perfect. But it's the best we've got when we try to recognise destructive environmental trends and then develop mechanisms for minimising those negative impacts. There is too little money, and too few full-time researchers, for that job to be done well without serious input from the broader community. As 'citizen scientists' we can collect data, vital to cutting-edge research, that depends on the birds that are all around us. Armed with our observations, scientists will continue to uncover new ways to glimpse our future in birds – and to our fate.[43]

With seabirds, individuals and groups can contribute through a variety of ways that don't require specialist skills. For example, river, river-mouth and estuary surveys, counts of surface- and tree-nesting seabirds (eg. gulls, terns and shags), at-sea observations, and recording signs of seabird activity along shorelines (eg. penguins on rocks or beaches) or on land (eg. active burrows or dead seabirds near trails in bush). In each case interaction with birds is kept to an absolute minimum. What is important is that observations are recorded accurately and this can be done through online resources such as eBird (www.ebird.com), or by contacting OSNZ representatives and Forest & Bird branches.

Research projects require volunteers. Fit people with experience are sought for field work. Participants in the types of projects outlined above can gain skills and familiarity with what's required. Such projects encourage younger people to become interested and active in seabird research.

43 Doherty, P.C. 2012. *Their fate is our fate: How birds foretell threats to our health and our world.* The Experiment, New York. 248pp.

Working Towards a New Zealand Seabird Colony Register

A truly national seabird colony register would enable records to be kept of all seabird colony sites in New Zealand. The information will be stored in a database that will be made freely available to bonafide seabird researchers and managers.[44]

Through the initiative of the IBA project, and funding from both the BirdLife International Community Conservation Fund and Forest & Bird, searches were made of relevant literature, through expert advice and review to locate records of seabird colonies for loading onto the database. All data compiled for this IBA project has been entered into the new Global Seabird Colony Register (World Seabird Union) and all the IBA site entries and polygons for the New Zealand IBAs are entered into the World Bird Database (WBDB) (BirdLife International/Conservation International). The New Zealand Seabird Colony Register will be developed from these databases.

In the future, information on previously known colonies will be updated after recent visits and new colonies will be entered as they are found. The register will enable all significant seabird sites and habitats to be readily identified for purposes such as statutory planning and resource management hearings along with management and scientific uses. The register will also allow quick access to information on the distribution and status of individual species. People visiting an area can check the database to see if seabird colonies are known from that site and when counts were last made of the populations.[45]

Studying seabird data. Photo: Andy Farrant

Planting day at Te Rere Point, Catlins. Photo: Fergus Sutherland

Feathers to the four winds – Hutton's Shearwater/Titi Kaikoura dawn ceremony. Photo: Nicky McArthur

44 Taylor, G.A. 2000B. *Action Plan for Seabird Conservation in New Zealand. Threatened Species Occasional Publication No. 17*. Department of Conservation, Wellington.

45 Ibid

NZ Fairy Tern public relations at Pakiri Beach, Hauraki Gulf. Photo: DOC

Next Steps for the New Zealand IBA Programme

We have identified 141 sites of global significance for seabirds on land, and a further 69 in the marine environment (marine IBAs). Over the next phase of the project we will:

- Identify more marine IBAs for pelagic areas
- Identify IBAs for other bird groups – land, water and shorebirds (see pages 38-39)
- Consult with tangata whenua, other stakeholders and landowners and identify conservation requirements for IBAs
- Assess the monitoring status of each IBA
- Set out a long-term monitoring plan for all New Zealand IBAs
- Prioritise the need for conservation action for IBAs
- Continue to gather and disseminate information about IBAs
- Undertake community education programmes, with local and regional groups, and government agencies at national and regional levels to establish IBA support groups
- As new information becomes available, continue to solicit IBA nominations for sites that meet the criteria.

OSNZ members surveying Australasian Gannet colony and monitoring erosion at Farewell Spit. Photo: Chris Gaskin

IBAs for other Bird Groups

The IBA network for New Zealand will only be complete when sites are identified for other groups of birds (ie. sites other than those for seabirds – see Table 1). There are considerable challenges ahead, especially when considering those birds which will figure as trigger species for an IBA. While a number of species have very restricted ranges (eg. Takahe, Kakapo, Orange-fronted (Malherbe's) Parakeet, Hihi/Stitchbird), some have wide distribution and scattered and small populations (eg. Rock (South Island) Wren, Kea). Birds such as Blue Duck fall between with scattered populations confined to rivers, sites that are for the most part known and their extent relatively easily determined. Breeding and non-breeding distributions will also have to be taken into account for migratory species moving within New Zealand (eg. Wrybill, South Island Pied Oystercatcher and Banded Dotterel).

How the IBA network will be completed is beyond the scope of this document. However, OSNZ through its Bird Atlas projects, involvement with databases (eg. waders) and eBird is well placed to take a major role.

Table 1. Threat classifications for New Zealand land, water and shorebird species (IUCN/BirdLife International). Least concern not included.[46]

Common Name	Species	IUCN Category	NZ Threat classification (2012)
Antipodes Parakeet	*Cyanoramphus unicolor*	VU	At risk – Naturally uncommon
Auckland Islands Rail	*Lewinia muelleri*	VU	At risk – Naturally uncommon
Auckland Islands Teal	*Anas aucklandica*	VU	Threatened – Nationally endangered / Vulnerable
Australasian Bittern	*Botaurus poiciloptilus*	EN	Threatened – Nationally endangered
Black Robin	*Petroica traversi*	EN	Threatened – Nationally critical
Black Stilt	*Himantopus novaezelandiae*	CR	Threatened – Nationally critical
Blue Duck	*Hymenolaimus malacorhynchos*	EN	Threatened – Nationally vulnerable
Brown Teal	*Anas chlorotis*	EN	At risk – Recovering
Campbell Island Teal	*Anas nesiotis*	EN	Threatened – Nationally critical
Chatham Oystercatcher	*Haematopus chathamensis*	EN	Threatened – Nationally critical
Chatham Parakeet	*Cyanoramphus forbesi*	EN	Threatened – Nationally endangered
Chatham Snipe	*Coenocorypha pusilla*	VU	Threatened – Nationally vulnerable
Great Spotted Kiwi	*Apteryx haastii*	VU	Threatened – Nationally vulnerable
Kaka	*Nestor meridionalis*	EN	Threatened – Nationally vulnerable
Kakapo	*Strigops habroptila*	CR	Threatened – Nationally critical

46 The New Zealand Threat Classification system recognises sub-species, a number of which fall into different categories (eg. Auckland Island and Campbell Island Teal)

Rock Wren. Photo: Frederic Pelsy

Blue Duck. Photo: Karen Baird

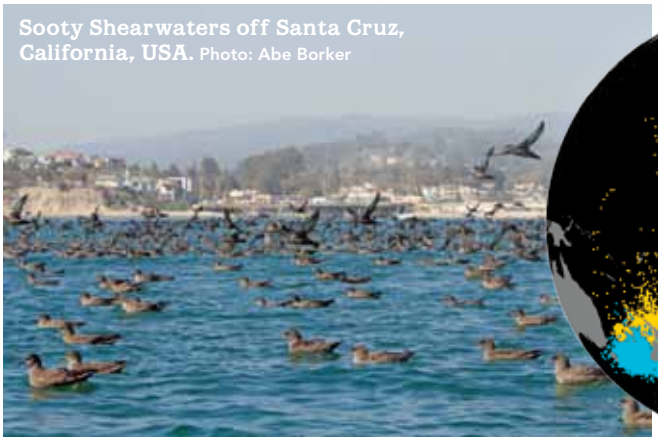
Yellowhead (Mohua). Photo: Frederic Pelsy

Kea	*Nestor notabilis*	VU	Threatened – Nationally endangered
North Island Kokako	*Callaeas cinereus*	EN	At risk – Recovering
Little Spotted Kiwi	*Apteryx owenii*	NT	At risk – recovering
NZ Dabchick (New Zealand Grebe)	*Poliocephalus rufopectus*	VU	Threatened – Nationally vulnerable
New Zealand Dotterel	*Charadrius obscurus*	EN	Threatened – Nationally critical/Vulnerable
New Zealand Falcon	*Falco novaeseelandiae*	NT	Threatened – Nationally vulnerable/At risk – Recovering
New Zealand Pigeon	*Hemiphaga novaeseelandiae*	NT	Not threatened
New Zealand Snipe	*Coenocorypha aucklandica*	NT	At Risk – Naturally uncommon
Northern Brown Kiwi	*Apteryx mantelli*	EN	Threatened – Nationally vulnerable
Okarito Brown Kiwi	*Apteryx rowi*		Threatened – Nationally critical
Red-crowned (Red-fronted) Parakeet	*Cyanoramphus novaezelandiae*	VU	At risk – Recovering
Orange-fronted (Malherbe's) Parakeet	*Cyanoramphus malherbi*	CR	Threatened – Nationally endangered
Rock (South Island) Wren	*Xenicus gilviventris*	VU	Threatened – Nationally endangered
Saddleback	*Philesturnus carunculatus*	NT	At risk – Recovering
Shore Plover	*Thinornis novaeseelandiae*	EN	Threatened – Nationally critical
South Island Kokako	*Callaeas cinerea*	DD	Data Deficient
Southern Brown Kiwi	*Apteryx australis*	VU	Threatened – Nationally endangered
Stitchbird	*Notiomystis cincta*	VU	Threatened – Nationally vulnerable
Takahe	*Porphyrio hochstetteri*	EN	Threatened – Nationally critical
Weka	*Gallirallus australis*	VU	Threatened – Nationally endangered/Vulnerable
Wrybill	*Anarhynchus frontalis*	VU	Threatened – Nationally vulnerable
Yellow-crowned Parakeet	*Cyanoramphus auriceps*	NT	Not threatened
Yellowhead	*Mohoua ochrocephala*	EN	Threatened – Nationally vulnerable

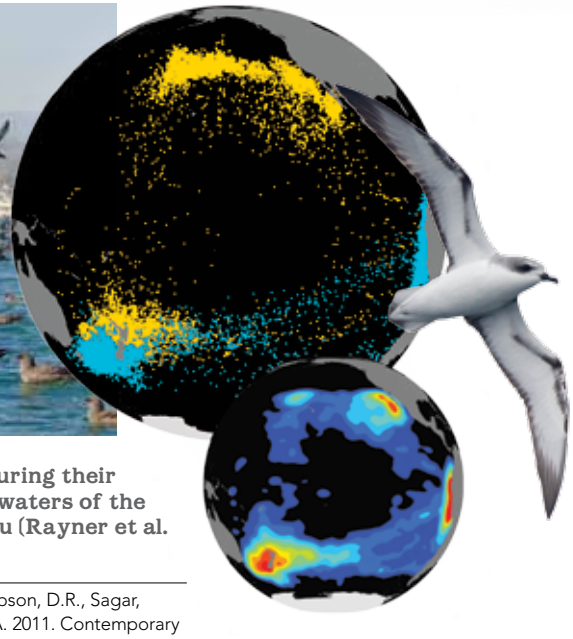
Sooty Shearwaters. Photo: Hadoram Shirihai © Tubenoses Project

Open Oceans – Working Across the Pacific

A large proportion of the seabirds breeding in New Zealand are highly migratory species which disperse to EEZs of other countries and international waters, mostly in the Pacific Ocean, but also moving into the South Atlantic and Indian oceans. Our New Zealand breeding seabirds can form a significant component of the marine biodiversity of a number of countries for periods of time. As a nation we share responsibility for seabird conservation throughout the Pacific region and our entry to the global IBA network and the inventory of sites presented for over one quarter of the world's seabird species highlights the importance of this.



Sooty Shearwaters off Santa Cruz, California, USA. Photo: Abe Borker



Cook's Petrels occupy the entire Pacific basin during their annual cycle with populations migrating to the waters of the North Pacific and the Humboldt current off Peru (Rayner et al. 2011). Photo: Abe Borker *

* Rayner, M.J., Hauber, M.E., Steeves, T.E., Lawrence, H.A., Thompson, D.R., Sagar, P.M., Bury, S.J., Landers, T.J., Phillips, R.A., Ranjard, L., Shaffer, S.A. 2011. Contemporary and historic separation of transhemispheric migration between two genetically distinct seabird populations. *Nature Communications 2*, 332, doi:DOI: 10.1038/ncomms1330.

New Zealand, and New Zealanders working with seabirds, can take a leading role in seabird conservation in the Pacific, whether it's through tracking the migration of New Zealand and Pacific Island-breeding seabirds, participation in existing forums (eg. ACAP, RFMOs, CMS, World Seabird Union), or, at a more local level, contributing expertise to individual seabird research and community conservation projects.

Seabird refuge, Morotiri, French Polynesia. Photo: Matt Jolly

Te Papa scientists at Vanuatu Petrel colony. Photo: Stephen Totterman

Critically, the breeding sites of a number of petrel species remain undiscovered in the South and Equatorial Pacific, and therefore much of their biology is unknown. There are species which are difficult to access, their breeding sites seldom surveyed (if at all), and consequently their biology and populations poorly known. New species are being 'discovered' at the same time they (and others) could be threatened with extinction. Even some well-known species are in serious decline. It's a dire situation requiring urgent action.

Recent discoveries serve as a wake-up call. They are reminders there is a great deal to learn about seabirds throughout the Pacific:

- A new species of seabird, the Pincoya Storm Petrel in Chile
- The possibility of a 'Coral Sea Storm Petrel' from sightings off New Caledonia and eastern Australia
- The discovery in 2013 of the breeding site of the New Zealand Storm Petrel, thought extinct until its rediscovery ten years before, only 40km from the centre of New Zealand's largest city.

Pincoya Storm Petrel. Photo: Peter Harrison

ADVOCATING SEABIRD PROTECTION IN GLOBAL FISHERIES

BirdLife International and partners including Forest & Bird, through the Global Seabird Programme, work with Regional Fisheries Management Organisations (RFMOs) across the world's oceans to advocate for protection of species vulnerable to fisheries such as albatrosses, petrels and shearwaters. RFMOs are organisations set up primarily for the management of highly prized tuna and swordfish. They also have obligations to conserve fisheries associated-species including seabirds, sharks and turtles through the international legal framework governing the oceans, including agreements such as the Code of Conduct for Responsible Fisheries and the UN Fish Stocks Agreement. New Zealand government agencies (MPI, DOC) are also actively involved in promoting conservation measures through these forums.

PACIFIC-WIDE SEABIRD PARTNERSHIP

A Pacific-wide seabird partnership is required, one that can pursue an action plan for seabirds that:

1. Provides a comprehensive overview of the state of the Pacific's seabirds
2. Encompasses seabird distribution, breeding sites and migration for all Pacific seabirds
3. Sets out priorities for seabird research and conservation throughout the Pacific
4. Recognises that collaboration between government agencies, conservation groups, and researchers working in the Pacific is necessary to secure protection for seabirds throughout their life history stages.

SHOWING THE WAY

The East Asia-Australasian Flyway Partnership (EAAFP) aims to protect migratory waterbirds (ie. shorebirds, ducks, geese, swans and cranes), their habitat and the livelihoods of people dependent on them. It is a network of partners within the East Asia-Australasian Flyway (EAAF), which is one of nine major migratory routes currently recognised globally. The EAAF extends from breeding grounds within the Arctic Circle, through East and South-east Asia, to Australia and New Zealand, stretching across 22 countries. A higher number and proportion of waterbirds are globally threatened in the EAAF than in any of the other seven major flyways of the world. Habitat loss and degradation is the primary driver of these trends. The EAAFP has a Seabird Working Group, however, seabirds are greatly overshadowed by the attention given to other bird groups.[47]

47 K. Woodley, manager Miranda Shorebird Centre, New Zealand (*pers. comm.*)

Godwit flock, Firth of Thames, New Zealand. Photo: Neil Fitzgerald

Red-tailed Tropicbird, Kermadec Islands. Photo: Karen Baird

New Zealand

A Special Place for Seabirds

Campbell Albatrosses.
Photo: Hadoram Shirihai © Tubenoses Project

FACT FILE

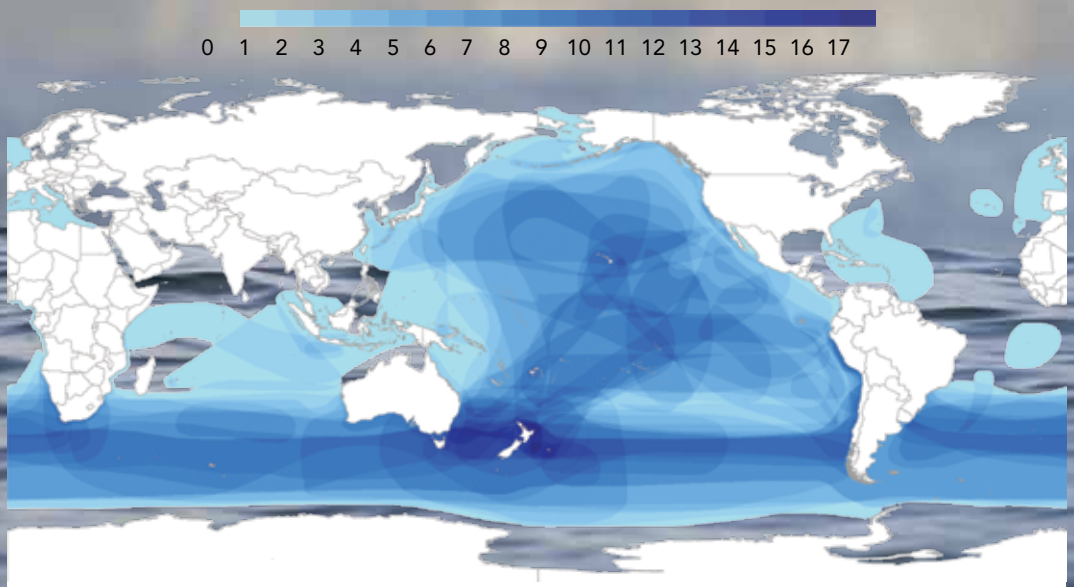
Seabirds

- There are around 10,400 species of birds worldwide.
- Remarkably, only 359 of the global total of birds are what we call 'seabirds'.
- Seabirds breed on land, but spend most of their lives at sea.
- They are essentially marine creatures and possess unique physiological and morphological adaptations.
- They can be highly mobile, and in some cases the whole population of a species can travel from one side of an ocean to another.
- They come in all shapes and sizes and are highly specialised.

New Zealand is a world centre of seabird diversity and is ideally suited to seabirds:

- Surrounded by productive oceans, presenting a multitude of breeding habitats
- Isolated from mammalian predators for millions of years prior to human arrival
- 86 breeding species (using IUCN classifications)
- 36 are endemic species (42%) breeding nowhere else in the world
- 140 species of the 359 seabirds are known to occur within New Zealand's EEZ, including species breeding outside the region
- New Zealand has more endemic and native seabirds (86 species) than the total of endemic and native land, water and shore birds combined (73 species).

GLOBALLY THREATENED SEABIRDS DENSITY



This density map shows tracking of threatened seabirds (albatrosses and petrels) across the world's oceans highlighting NZ's position as a global hotspot for seabirds. That status is further enhanced if one considers the concentration and diversity of penguin and shag species breeding here. *Source: BirdLife International's Global Seabird Tracking Database (2012)*

HOW MANY SEABIRDS BREED IN NEW ZEALAND?

>1 million pairs (n=5)

Sooty Shearwater
Black-winged Petrel
Fairy Prion
White-faced Storm Petrel
Common Diving Petrel

100,000-500,000 pairs (n=12)

Black-backed Gull
Broad-billed Prion
Mottled Petrel
Cooks Petrel
Grey-faced (Great-winged) Petrel
White-headed Petrel
Buller's Shearwater
Antarctic Prion
Little Shearwater
White-capped Albatross
White-chinned Petrel
Hutton's Shearwater

10,000-100,000 pairs (n=22)

Rockhopper Penguin
Erect-crested Penguin
Snares Crested Penguin
Blue Penguin
Grey Petrel
Spotted Shag
Campbell Albatross
Buller's Albatross
Salvin's Albatross
Fulmar Prion
White-naped (White-necked) Petrel
Pycroft's Petrel
Flesh-footed Shearwater
Wedge-tailed Shearwater
Fluttering Shearwater
Grey-backed Storm Petrel
Australasian Gannet
Red-billed Gull
Black-billed Gull
White-fronted Tern
Grey Ternlet (Grey Noddy)
Sooty Tern

All other species (n=47) have less than <10,000 pairs each.[48]

Total number of seabirds breeding in New Zealand is c.14 million pairs.

48 Information provided by Graeme Taylor, Department of Conservation

Northern Royal Albatross, Kaikoura.
Photo: Hadoram Shirihai © Tubenoses Project

CHARACTERISTICS OF SEABIRDS

Seabirds have evolved from a wide range of different taxonomic groups. Common to all is that they spend some part of their life cycle feeding over the open sea. This separates seabirds from waders that feed in the littoral zone or on shorelines and from species that regularly roost at sea such as ducks and swans. Seabirds have water resistant feathering (from oils in the preen gland) that enable them to fully immerse in salt water. They have webbed feet that allow them to swim in water and can readily become airborne off the water. Most seabirds have short legs and powerful wings or flippers. All have bills with sharp hooks, points, or filters which enable them to catch fish, cephalopods, crustaceans, and plankton. Lastly, seabirds can drink saltwater and have physiological adaptations for removing excess salt.

From Taylor, G.A. (2000a) *Action Plan for Seabird Conservation in New Zealand.* Department of Conservation, Wellington.

Legal Protection of New Zealand Seabirds

All seabirds breeding within New Zealand are fully or in a few cases partially protected under the Wildlife Act 1953 and its amendments. That is, with one exception; Black-backed Gulls are not protected under Schedule 5 of the Wildlife Act. Seabirds breed on a large number of island and coastal sites that are administered by Department of Conservation (DOC), regional authorities, private landowners and local iwi. Seabirds that visit New Zealand waters, but don't breed in New Zealand, are also covered under the Wildlife Act.

Islands and mainland sites have varying protection status under the Wildlife Act 1953 and Reserves Act 1977 including Recreation Reserve, Wildlife Refuge, Scientific Reserve, and the highest protection categories: Wilderness Area, Nature Reserve and National Park. Access to these locations can be dependent upon their protection classification in accordance with the Reserves Act and may require a written landing permit. In general any work with seabirds requires research permission from DOC, following consultation with tangata whenua. Such permission is dependent upon perceived conservation benefit to the species and overall research value.

Marine reserves are specified areas of the sea and foreshore that are managed to preserve them in their natural state as the habitat of marine life for scientific study. Marine reserves may be established in areas that contain underwater scenery, natural features, or marine life of such distinctive quality, or so typical, beautiful or unique that their continued preservation is in the national interest. Within a marine reserve all marine life is protected, and fishing and the removal or disturbance of any living or non-living marine resource is prohibited, except as necessary for permitted monitoring or research. This includes dredging, dumping or discharging any matter or building structures. If they are large enough, there are ecosystem benefits for seabirds.

Marine mammal sanctuaries have been established throughout New Zealand fisheries waters to create a permanent refuge for marine mammals. Such sanctuaries may prohibit activities known to harm particular marine mammal species, such as dolphins, whales, seals and sea lions. For example, a marine mammal sanctuary may not exclude all fishing activities, but may restrict what fishing methods may be used. Under the Marine Mammals Protection Act 1978, the Department of Conservation is responsible for administering and managing marine mammal sanctuaries. Where set net bans are in place there is a major benefit to various seabird species, especially a number of penguin, shag and shearwater species.

The purpose of the Fisheries Act 1996 is to provide for the utilisation of fisheries resources while ensuring sustainability. "Ensuring sustainability" is defined by the Act as maintaining the potential of fisheries resources to meet the reasonably foreseeable needs of future generations, and avoiding, remedying, or mitigating any adverse effects of fishing on the aquatic environment, which includes seabirds. Further impetus to manage the impacts of fishing on seabirds is provided through Section 9 of the

Curtis and Cheeseman Islands, Kermadec Islands Nature and Marine Reserves. Photo: Chris Gaskin

Fisheries Act, which requires decision-makers to take into account the environmental provisions in the Act, which include: 1) associated or dependent species (which includes seabirds) should be maintained above a level that ensures their long-term viability, and 2) the biological diversity of the aquatic environment should be maintained (DOC 2011).

The National Plan of Action for Seabirds (NPOA-S) is a single issue plan that has been developed jointly between DOC and the Ministry for Primary Industries (MPI) with considerable stakeholder input (2012). The plan sets out a long-term strategic approach to reducing the incidental by-catch of seabirds in New Zealand fisheries zones or by New Zealand-flagged vessels in high-seas fisheries. The NPOA-S informs the priorities on issues relating to interactions between fisheries and seabirds. Although this plan does not cover indirect effects of commercial fishing on seabirds (for example, through alteration of habitat and/or food availability), the Draft Conservation Services Programme (CSP) Strategic Statement (2013) sets out indirect effects as a research priority.

The Resource Management Act (1991) (RMA) under Section 6 (Matters of National Importance) requires, for example, recognition and provision for the preservation of the natural character of the coastal environment (including the coastal marine area), the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna.

Tangata Whenua

The New Zealand government has a relationship with Māori through the Treaty of Waitangi that is enshrined in legislation (eg. Section 4 of the Conservation Act, 1987). This relationship carries with it opportunities and obligations that are reflected in goals of the New Zealand Biodiversity Strategy (NZBS): protecting the interests iwi have in indigenous biodiversity, building and strengthening their partnerships with Crown agencies, and conserving and sustainably using indigenous biodiversity.[49]

Grey-faced (Great-winged) Petrel/oi. Photo: DOC

Seabirds are harvested in many parts of the world for food. In New Zealand Aotearoa Māori have had a special interest. 'Muttonbirding' is the body of techniques whereby the chicks and fledglings of various Procellariiformes are caught, processed and preserved for food.[50] Archaeological data indicates that harvesting was widely practised by Māori in prehistoric New Zealand, but estimates of the period of intense exploitation remain uncertain.[51] Sooty Shearwater (tītī) and Grey-faced (Great-winged) Petrel (oi), the latter harvested occasionally on northern offshore islands, are governed by the following legislation:

http://www.legislation.govt.nz/regulation/public/1978/0059/latest/DLM61925.html

http://www.legislation.govt.nz/regulation/public/1979/0237/latest/whole.html#DLM67092OUR

49 Towns, D.R., Bellingham, P.J., Mulder, C.P.H., Lyver, P.O.B. 2012. A research strategy for biodiversity conservation on New Zealand's offshore islands. *New Zealand Journal of Ecology 36*: 1-20

50 Lyver, P. O'B. 2000. Sooty shearwater (*Puffinus griseus*) harvest intensity and selectivity on Poutama Island, New Zealand. *New Zealand Journal of Ecology 24*: 169-180.

51 Anderson, A. 1997. Historical and archaeological aspects of muttonbirding in New Zealand. *New Zealand Journal of Archaeology 17*: 35-55

RAKIURA MĀORI RIGHTS TO MUTTONBIRDING

Rakiura (Stewart Island) Māori, the Māori people of New Zealand's southernmost region and their descendants, have rights to gather muttonbirds on 36 islands, known as the Tītī Islands, around Stewart Island. They can harvest chicks each year from 1 April to 31 May. Under the Tītī (Muttonbird) Islands Regulations 1978, people can arrive from 15 March to prepare for the season.

The muttonbirding rights of Rakiura Māori are also guaranteed by the 1864 Deed of Cession of Stewart Island. Under subsequent regulation, 18 of the Tītī Islands are termed Beneficial Islands, to which only certain Rakiura Māori families have joint ownership and right of access. The remaining 18 are known as the Rakiura Tītī Islands, which up until the Ngai Tahu Claims Settlement Act 1998 were also known as the Crown Tītī Islands. Prior to 1998 they were owned and controlled by the Crown, subject to the right of Rakiura Māori to harvest tītī.

Rakiura Māori have used muttonbirds for food, as a trade item, and for their feathers and down. The harvest has huge cultural and economic significance.

Muttonbirds are plentiful, and in recorded history Rakiura Māori have never imposed a catch quota. Harvest-management systems on each of the islands are determined by traditional guidelines (kaitiakitanga) or by the muttonbirders who arrive there before 1 April. There are two main forms of management: 1/ A closed system, where families have a designated harvesting area and 2/ an open system, where individuals have the right to harvest chicks from anywhere on the island.

Muttonbirding systems have changed over the years, depending on the method most preferred by the Rakiura beneficiaries and the 18 Crown Tītī Islands at the time.

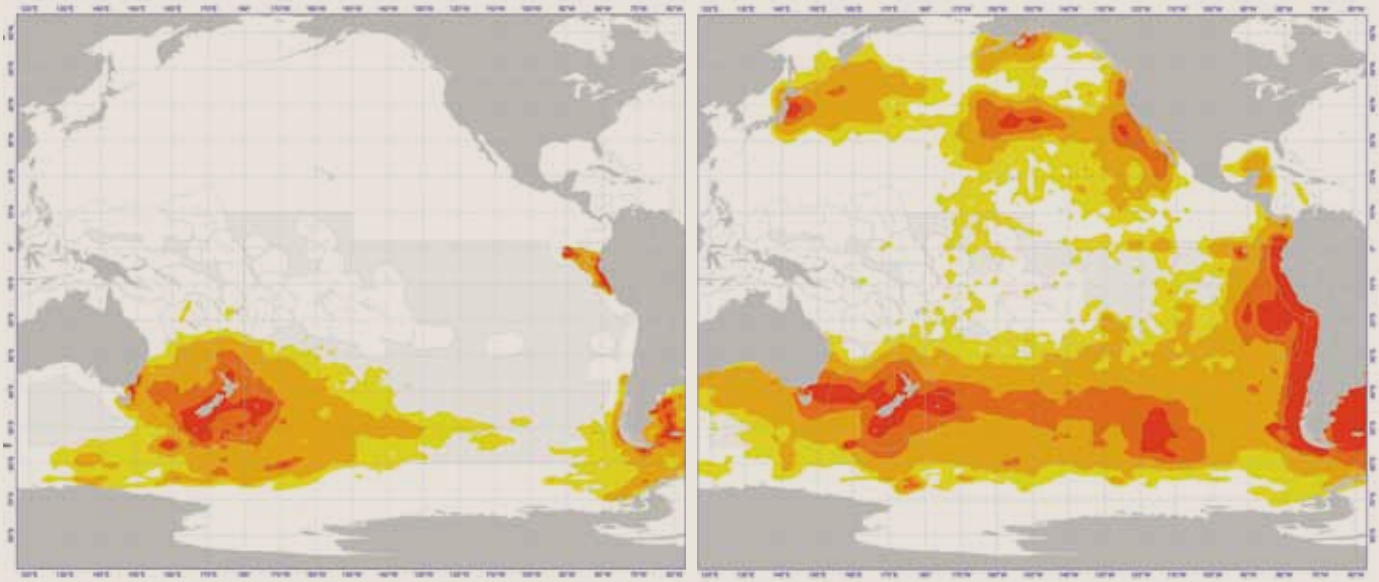
From Philip Lyver, Jamie Newman and the Rakiura Titi Islands Administering Body 'Titi – muttonbirding – Muttonbirding in New Zealand', Te Ara – the Encyclopedia of New Zealand, updated 22-Sep-12

International Obligations

The New Zealand government and other Pacific island nations have committed, under several multi-lateral agreements, to reducing negative human impacts on the environment and providing greater levels of protection and conservation action for wildlife. Data collected under BirdLife programmes can help to track progress towards these targets. New Zealand is a signatory to, or participates in, the following agreements or conventions with relevance to seabirds:

- Convention on Biological Diversity (CBD)
- Agreement for the Conservation of Albatrosses and Petrels (ACAP)
- International Convention on Migratory Species of Wild Animals (CMS)
- United Nations Convention on the Law of the Sea (UNCLOS)
- United Nations Fish Stocks Agreement (UNFSA)
- Food and Agriculture Organisation (FAO) Code of Conduct for Responsible Fisheries
- South Pacific Regional Fisheries Management Organisation (SPRFMO)
- Western Central Pacific Fisheries Commission (WCPFC)
- Inter-American Tropical Tuna Commission (IATTC)
- Commission for the Conservation of Southern Bluefin Tuna (CCSBT)
- Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR).

Sooty Shearwaters. Photos: Frederic Pelsy (top) and Hadoram Shirihai © Tubenose Project



Overlap between the management area of the South Pacific Fisheries Management Organisation and pelagic seabird species, all species during breeding (left) and non-breeding (right). Source: Baird, K.A., Taylor, P., Small, C. 2012. Potential Impact of Fishing Activity in the SPRFMO Area to Seabirds. Swg-11-INF-02 (rev1) presented at the 11th Meeting of the Science Working Group, Lima, Peru, 15-19 October 2012

THE CONVENTION ON BIOLOGICAL DIVERSITY

Vision – Living in Harmony with Nature

By 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people.

Mission – Take effective and urgent action to halt the loss of biodiversity in order to ensure that by 2020 ecosystems are resilient and continue to provide essential services, thereby securing the planet's variety of life, and contributing to human well-being, and poverty eradication. To ensure this, pressures on biodiversity are reduced, ecosystems are restored, biological resources are sustainably used and benefits arising out of utilization of genetic resources are shared in a fair and equitable manner; adequate financial resources are provided, capacities are enhanced, biodiversity issues and values mainstreamed, appropriate policies are effectively implemented, and decision-making is based on sound science and the precautionary approach.[52]

Aichi Biodiversity Targets

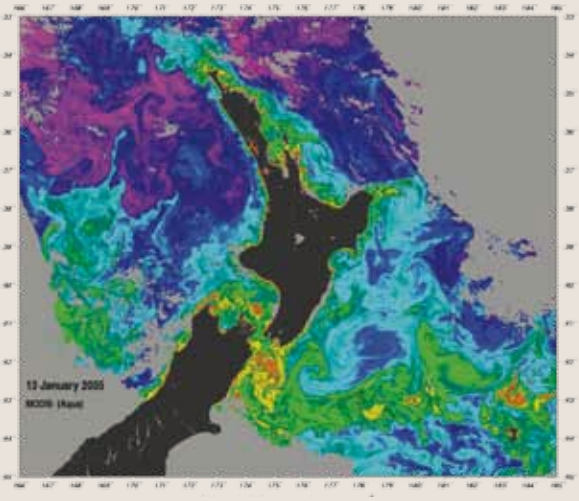
- Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society
- Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use
- Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity
- Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services
- Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building[53]

Convention on Biological Diversity

52 http://www.cbd.int/sp/elements, viewed 12 Feb 2014
53 http://www.cbd.int/sp/targets/default.shtml, viewed 12 Feb 2014

New Zealand Seabird Setting

New Zealand is an archipelago comprising three major islands and more than 700 offshore islands and islets. The country spans 30 degrees of latitude (26°S-56°S) and includes a high diversity of seafloor relief, including deep sea trenches. One, the Kermadec Trench, is more than 10km deep. The latitudinal spread of New Zealand, coupled with the varied seafloor relief, is mirrored by the wide diversity of marine habitats. The country influences the flow of the major water masses and results in shelf-edge currents and oceanic eddies that interact with coastal waters over shelf areas, bringing oceanic water into the coastal zone. New Zealand is an ideal setting for seabirds – a wide variety of habitats and places to breed, and surrounded by productive waters.



Aqua MODIS (NASA) image across part of New Zealand and the EEZ showing chlorophyll-a (phytoplankton) concentrations, highlighting upwelling, convergence and current zones. Source: http://oceancolor.gsfc.nasa.gov/cgi/image_archive.cgi?c=CHLOROPHYLL

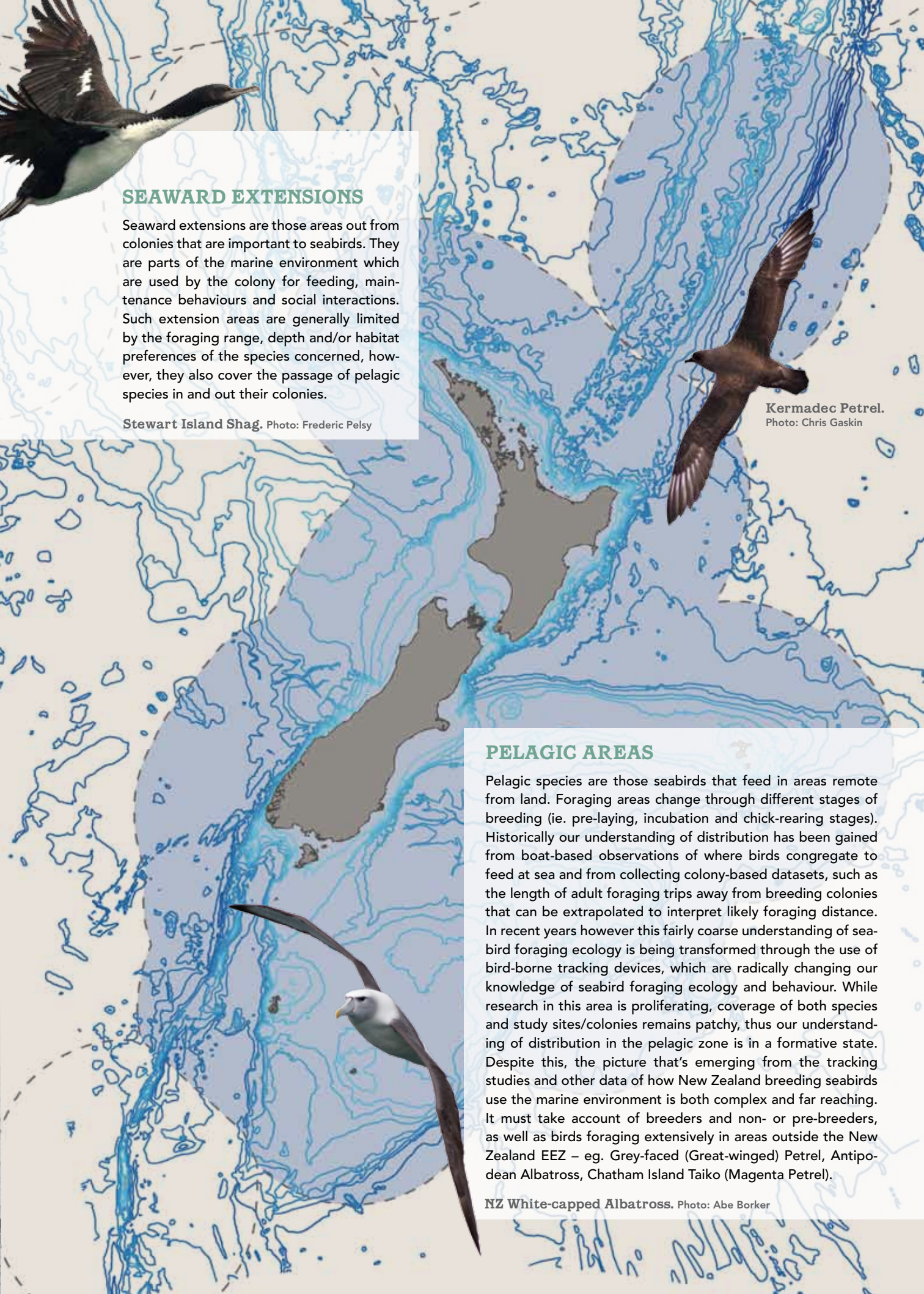
CREATING A DYNAMIC MAP FOR NEW ZEALAND'S SEABIRDS

Seabird colonies

- Breeding (season) – ie. spring/summer (eg. Cook's Petrel), summer/autumn (Kermadec Petrel), autumn/winter (eg. New Zealand and White-bellied Storm Petrels), winter/spring (eg. Grey-faced Petrel), or through most of the year (eg. Pied Shag).
- Latitudinal variation within a species – eg. White-faced Storm Petrel (Hauraki Gulf, Stewart Island, Chatham Islands, Subantarctic Islands; Cook's Petrel (Te Hauturu-o-Toi/Little Barrier Island and Whenua Hou/Codfish island), Little Shearwater (Kermadec Islands, Hauraki Gulf, Chatham Islands, Antipodes Islands).
- Breeding cycle (annual or biennial) – annual (most seabirds), biennial (some albatross species), two years on, two years off (large albatrosses).
- Non-breeders include birds too young and inexperienced to nest successfully, and those lacking nests or partners. Others are birds that formerly bred but for various reasons are not currently doing so – they may have lost their nest or their partner. Failed breeders join the non-breeding category later in the season.[54] Where pre-breeders spend most of their time before they start breeding is still largely unknown for most species; however, it is likely many will visit natal sites through this period.
- Resident all-year round – species that disperse to moult or migrate will vacate colony sites for several months each year; however some species can spread their breeding through much of the year (eg. Pied Shag) or will use colony sites for roosting during non-breeding periods.
- Environmental variation – for example, during El Nino and La Nina years – can affect the proportion of seabirds that breed in a particular year.

54 Warham, J. 1990. *The Petrels: Their Ecology and Breeding Systems.* Academic Press, London. 440pp.

Cook's Petrels rafting in Hauraki Gulf.
Photo: Abe Borker



SEAWARD EXTENSIONS

Seaward extensions are those areas out from colonies that are important to seabirds. They are parts of the marine environment which are used by the colony for feeding, maintenance behaviours and social interactions. Such extension areas are generally limited by the foraging range, depth and/or habitat preferences of the species concerned, however, they also cover the passage of pelagic species in and out their colonies.

Stewart Island Shag. Photo: Frederic Pelsy

Kermadec Petrel.
Photo: Chris Gaskin

PELAGIC AREAS

Pelagic species are those seabirds that feed in areas remote from land. Foraging areas change through different stages of breeding (ie. pre-laying, incubation and chick-rearing stages). Historically our understanding of distribution has been gained from boat-based observations of where birds congregate to feed at sea and from collecting colony-based datasets, such as the length of adult foraging trips away from breeding colonies that can be extrapolated to interpret likely foraging distance. In recent years however this fairly coarse understanding of seabird foraging ecology is being transformed through the use of bird-borne tracking devices, which are radically changing our knowledge of seabird foraging ecology and behaviour. While research in this area is proliferating, coverage of both species and study sites/colonies remains patchy, thus our understanding of distribution in the pelagic zone is in a formative state. Despite this, the picture that's emerging from the tracking studies and other data of how New Zealand breeding seabirds use the marine environment is both complex and far reaching. It must take account of breeders and non- or pre-breeders, as well as birds foraging extensively in areas outside the New Zealand EEZ – eg. Grey-faced (Great-winged) Petrel, Antipodean Albatross, Chatham Island Taiko (Magenta Petrel).

NZ White-capped Albatross. Photo: Abe Borker

POST-BREEDING DISTRIBUTION

Animal migration is the relatively long-distance movement of individuals on an annual or seasonal basis, triggered by local climate, food availability or for mating reasons. For some seabirds this means heading thousands of kilometres to the Northern Hemisphere; others will stay within the Southern Hemisphere. However, post-breeding behaviour is not always clear cut. For example, some adult Australasian Gannet migrate to Australia yet most stay in New Zealand all year around. Fledglings by contrast fly from New Zealand to Australia directly and typically do not return to their home colonies until their third year.[55] About 95% of Grey-faced (Great-winged) Petrels migrate to eastern Australia each summer but a few stay near New Zealand. Similarly some Chatham Islands Taiko (Magenta Petrel) go to South America, some to the Tasman Sea and others go only short distances north of the Chatham Islands in winter.

Within New Zealand's EEZ

Many Fluttering Shearwaters remain locally, although birds from the Hauraki Gulf have been found to disperse to Subantarctic waters, and also Australian waters.[56] Pre-breeders can also spend time in Australian waters.

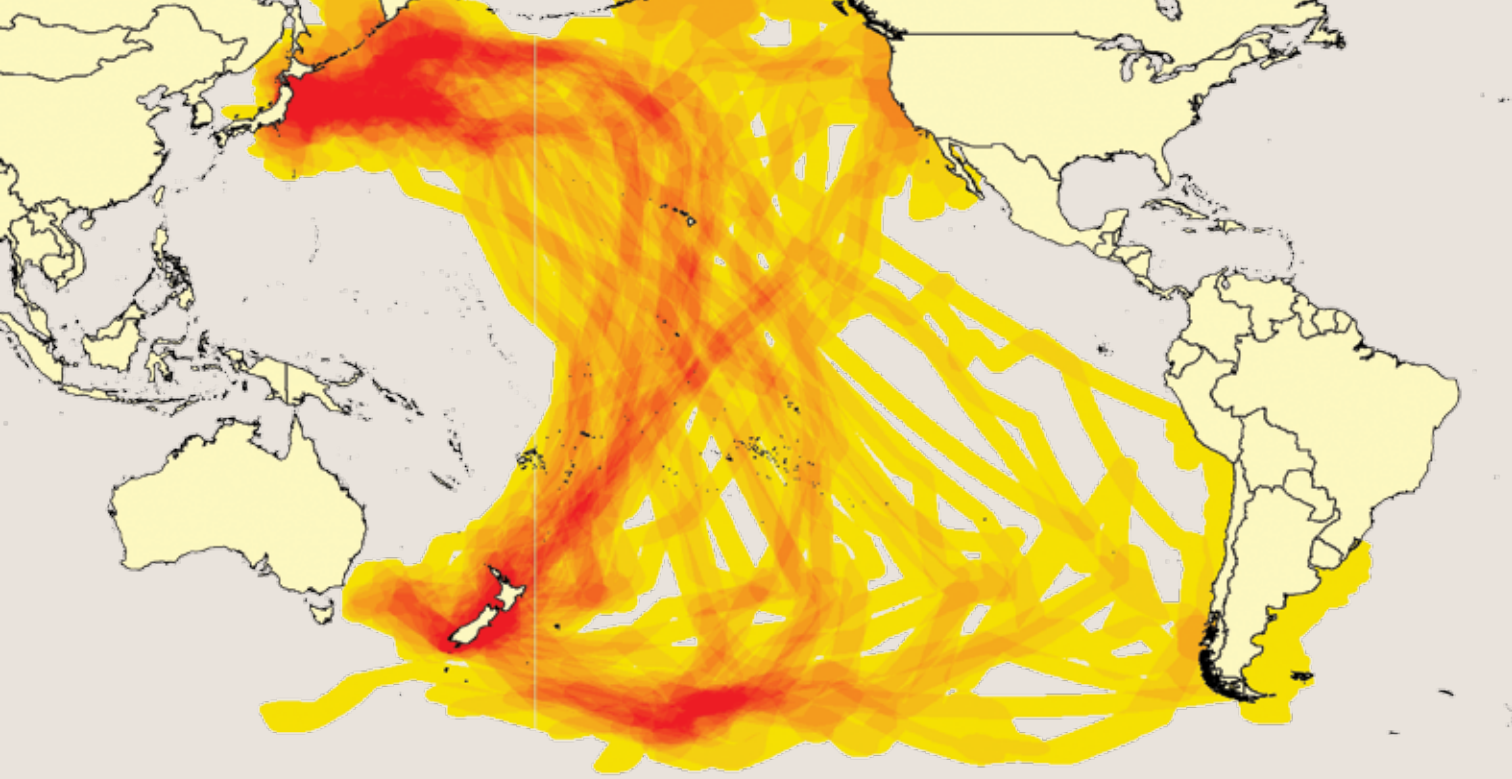
Yellow-eyed Penguins are for the most part sedentary throughout the year, with some, mostly young birds, straggling outside their home range. Little Penguins can spend time further out to sea from the breeding areas post-breeding.

Shag, gull and tern species, eg. Spotted Shags, congregate in places away from breeding sites (eg. Oamaru and Timaru Harbours, Ashburton River and Ashley Estuary). Red-billed Gulls in the Hauraki Gulf appear to congregate around winter feeding grounds, possibly from a number of breeding sites.

Inland breeding Black-fronted Terns disperse to the coasts around the eastern and southern South Island with some spending time in the North Island and Rakiura (Stewart Island).

55 Ismar, S.M.H. 2013. Australasian gannet. In Miskelly, C.M. (ed) *New Zealand Birds Online*. www.nzbirdsonline.org.nz
56 Taylor unpubl. data

Diminutive White-faced Storm Petrels migrate to eastern Pacific Ocean. Photo: Neil Fitzgerald



Sooty Shearwater distribution during breeding and on migration (Shaffer et al).[1]
Map: BirdLife International

1. Shaffer, S.A., Tremblay, Y., Weimerskirch, H., Scott, D., Thompson, D.R., Sagar, P.M., Moller, H., Taylor, G.A., Foley, D.G., Block, B.A., Costa, D.P. 2006. *Migratory shearwaters integrate oceanic resources across the Pacific Ocean in an endless summer. Proceedings of the National Academy of Sciences of the United States of America 103*: 12799-12802 doi 10.1073/pnas.0603715103

Outside New Zealand's EEZ

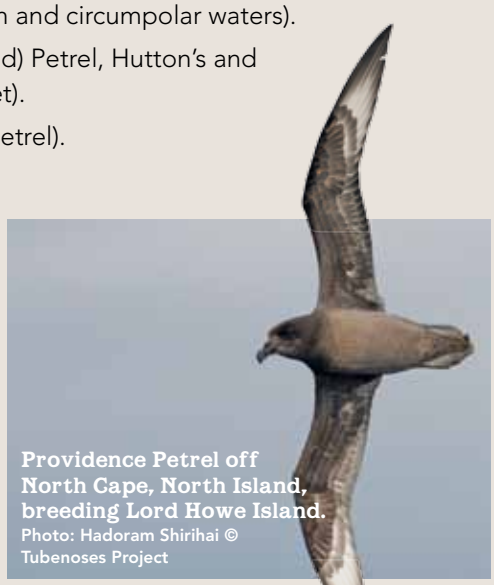
Northern Hemisphere (Sooty, Flesh-footed and Buller's Shearwaters, Mottled, Cook's, Pycroft's and Black-winged Petrels).

Southern Hemisphere (White-faced Storm Petrel to the eastern Pacific Ocean; Black and Westland Petrels; Little Shearwater to the Sub-tropical Convergence, mid-ocean; and all albatross species to South American and circumpolar waters).

Australian waters (Grey-faced (Great-winged) Petrel, Hutton's and Fluttering Shearwaters, Australasian Gannet).

Polar Front (Grey Petrel, Common Diving Petrel).

Great Frigatebird over Raoul Island.
Photo: Gareth Rapley



Providence Petrel off North Cape, North Island, breeding Lord Howe Island.
Photo: Hadoram Shirihai © Tubenoses Project

VISITORS

Seabirds breeding in other countries also visit New Zealand waters, eg. Wandering (Snowy) and Black-browed Albatrosses, and Great Shearwater from the South Atlantic, Indian Yellow-nosed Albatross from the Indian Ocean, Short-tailed Shearwaters, Gould's and Providence Petrels, Great Frigatebird and Crested Tern from the Pacific Islands and Australia, and Wilson's Storm Petrel and Emperor Penguin from Antarctica.

Life Cycle Stages

In general all seabirds follow a similar life cycle pattern. However, there can be considerable variation in life cycle stages between species and the different seabird groups, in terms of behaviour, duration and season, and also the threats they face. A site network, as identified here, must adequately capture the extent of this variation.

1. Pre-egg stages

- Cleaning out burrows (Little Penguin, petrels, shearwaters), building surface nests (most penguins, albatrosses, gannets/boobies, shags, gulls, terns, noddies).
- Pre-lay exodus – during this period the female will head out to sea to feed and grow the egg; males can also spend time away from colonies but may stay to defend nest sites.

Australasian Gannets displaying. Photo: Stefanie Ismar

Red-tailed Tropicbird. Photo: Chris Gaskin

2. Laying and incubation

- Eggs laid.
- Incubation (changeover times varies). Petrels and albatrosses have long incubation periods, with both partners sharing time on the nest. Changeover times will depend on food availability and where it is located, ie. distances flown and time away from the nest.

4. Chick raising

- Eggs hatch.
- Chicks reared. In most seabirds the brood time is quite short. Both parents do the feeding. Intervals between feeds depend on food availability and distances from nest sites.
- Parents depart. Some seabirds will feed their chicks right up to fledging. Others will stop earlier during which time the chick uses up stored fat prior to departing the nest.

Spotted Shag feeding chick. Photo: Frederic Pelsy

Kermadec Petrel and chick. Photo: Karen Baird

Cook's petrel fledgling. Photo: Karen Bourgeois

5. Fledging

- Chicks depart.

3. Non/pre-breeder activity

- In the colony the non-breeders include pre-breeders (ie. birds too young and inexperienced to nest successfully) and birds that have bred before and are not currently doing so, or are failed breeders.
- At sea non-breeders (or unemployed birds) do not have the demands of raising chicks and can range more extensively, or are conspicuous as birds gather in the vicinity of colonies.
- Departure (generally earlier than breeding birds).

Moulting Erect-crested Penguin. Photo: Kim Westerskov

6. Moult

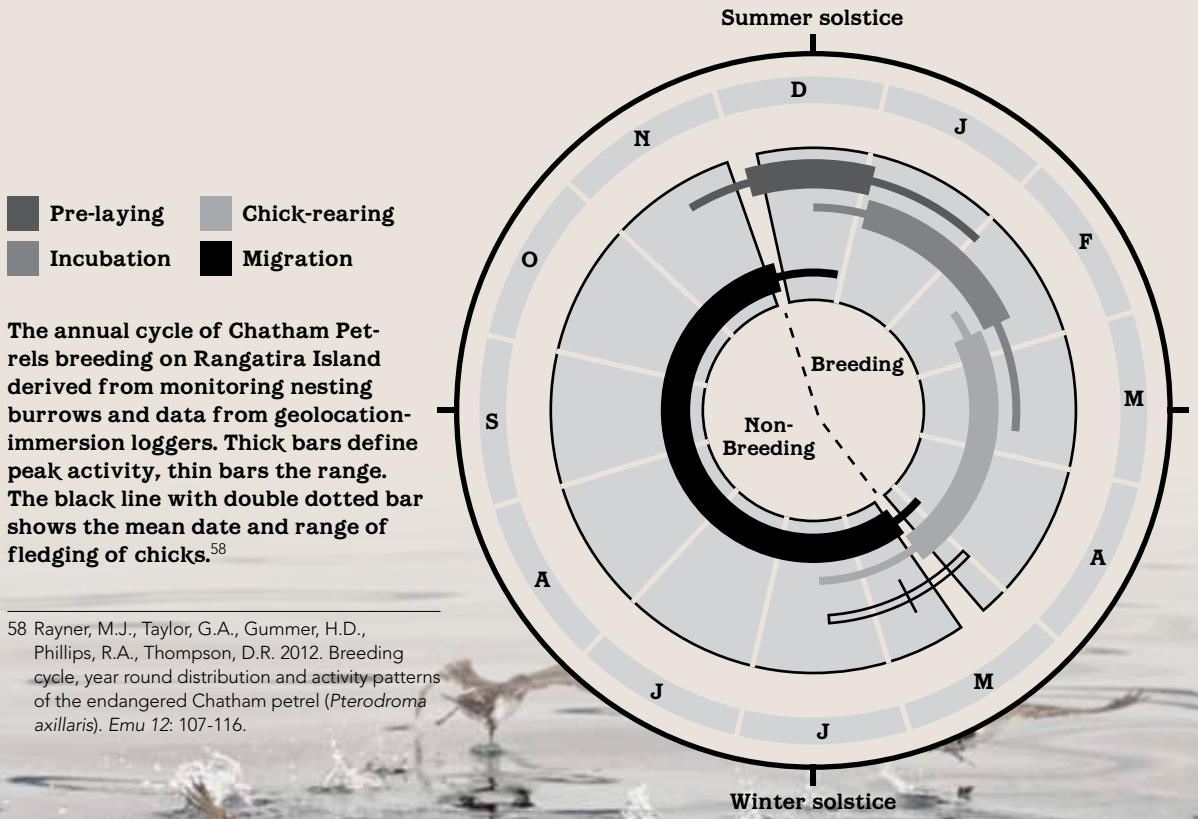
- Feathers don't last forever and need to be replaced. Moulting patterns reflect factors such as their habitat, food, clutch size, migration distance and body size.[57]

7. Post-breeding

- None or few birds on breeding grounds.
- Seabirds remain resident at breeding grounds.

8. Migration

57 Howell, S.N.G. 2010. *Molt in North American Birds*. Houghton Mifflin Harcourt Publishing Company, New York.



The annual cycle of Chatham Petrels breeding on Rangatira Island derived from monitoring nesting burrows and data from geolocation-immersion loggers. Thick bars define peak activity, thin bars the range. The black line with double dotted bar shows the mean date and range of fledging of chicks.[58]

58 Rayner, M.J., Taylor, G.A., Gummer, H.D., Phillips, R.A., Thompson, D.R. 2012. Breeding cycle, year round distribution and activity patterns of the endangered Chatham petrel (*Pterodroma axillaris*). *Emu 12*: 107-116.

Fluttering Shearwaters post-breeding, showing moult.
Photo: Hadoram Shirihai © Tubenoses Project

Chatham Island Shag colony. Photo: Igor Debski

Erect-crested Penguins, Antipodes Island. Photo: Hadoram Shirihai © Tubenoses Project

Light-mantled Sooty Albatrosses, Campbell Island. Photo: Kyle Morrison

Cook's Petrel climbing tree. Photo: Karen Bourgeois

Seabirds on Land

Collectively, seabirds use the full spectrum of nesting habitat: nesting above the ground in shrubs and trees, on the ground, and in burrows below the ground's surface.

Seabirds that nest in trees do so in a variety of habitats, for example, Pied and Little Shags in coastal bays and estuaries, Black (Great) and Little Black (Cormorants) Shags over fresh water, Black Noddy in Pisonia trees on the Meyer Islands and White Tern in pohutukawa on Raoul Island, Kermadec Islands.

Ground-nesting birds (eg. albatrosses, gannets and boobies, penguins, some shags, tropicbirds, gulls, terns, noddies) can be separated into those that nest in open ground and those that prefer shade, finding it under rock overhangs, on ledges with rock overhangs above them, under shrubs or within forest. Some of these birds build pedestal nests, eg. mollymawks and some shag species.

Black-billed Gull colony, Southland. Photo: Rachel McClellan

White-faced Storm Petrel at burrow entrance.
Photo: Abe Borker

Petrel and shearwater burrows, Macauley Island.
Photo: Peter Dilks

Gibson's (Antipodean) Albatross on nest.
Photo: Kath Walker

Some species (notably storm petrels and diving petrels) can nest under thick low-growing vegetation, for example, in the bases of tussocks (Grey-backed Storm Petrel), under sedges and even rank pasture grass and bracken (White-faced Storm Petrel and Common Diving Petrel).

Most petrels, shearwaters, diving petrels and storm petrels nest in burrows. As a general rule, burrow size varies with bird size, ranging from a burrow with an entrance 50 cm wide and being over 3m long (Sooty and Wedge-tailed Shearwaters) to those whose openings are 5-8cm wide and less than 1m long (small shearwaters, diving petrels and storm petrels).

The known breeding sites of New Zealand Storm Petrel are in steep rubbly ground deep within forest, as much crevices as they are burrows.

Seabirds' habit of breeding in colonies is one of their salient characteristics, and contrasts with most land birds which defend breeding territories in which they do most of their feeding. Their 1/ adaptation to life in the marine environment reduces mobility on land and ability to escape predators; 2/ vulnerability to predation, especially by terrestrial mammals places a premium on breeding on islands that terrestrial mammals have failed to reach, 3/ the large area available for foraging means seabird populations can be very large, 4/ clumping together allows protection against avian predators, and 5/ the practical problem of defending a feeding territory at sea appears.[59]

Colonies can be densely packed like those Australasian Gannet, terns and gulls, and some albatrosses, penguins and shags. Colonies of some burrowing petrels can be so dense and the ground made so fragile that anyone walking through them can destroy many burrows. Some colonies are less obvious, especially those in forest. Similarly, the colonies of Fiordland, Yellow-eyed and Little Penguins are generally very discreet, with only the well-worn trails, guano splashes and smell giving their presence away.

59 Gaston, A.J. 2004. *Seabirds: a natural history.* Christopher Helm, an imprint of A&C Black, London. 224pp.

Life at Sea

Seabirds are genuine marine creatures. They spend most of their lives at sea earning a living from the ocean and have evolved to exploit different types of food. Seabirds share this resource by feeding either on one group exclusively or on a variety of food groups. Some birds stay predominately over land and feed over rivers, lakes, and farmland, only occasionally venturing to inshore seas. Others feed in harbours, estuaries, or bays. Some species forage out over the continental shelf and along the shelf break. Species with long wings and rapid flight are able to forage far out over deep pelagic water. Seabirds also divide up the food resource by foraging only in water of certain temperatures. Thus there are tropical, sub-tropical, temperate, sub-antarctic, and Antarctic specialists. Finally, some species are scavengers/opportunists and a few are predators of other seabirds.[60]

60 Taylor, G.A. 2000a: *Action plan for seabird conservation in New Zealand. Part A: Threatened Seabirds. Threatened Species Occasional Publication 16.* Department of Conservation, Wellington. 234pp.

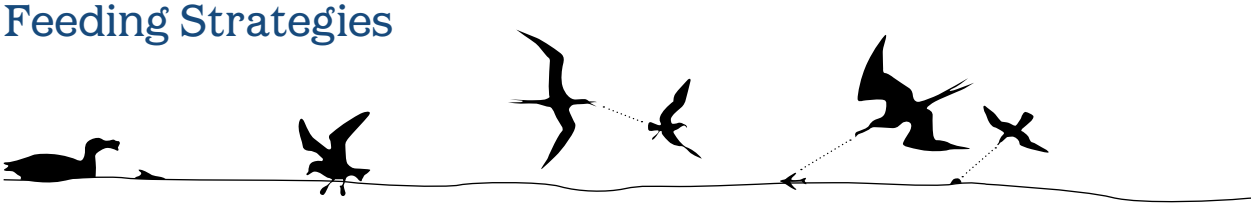
INSHORE OR NEAR-SHORE WATERS

- Shags – fish, cephalopods
- Gulls – fish, marine invertebrates
- Terns – fish
- Australasian Gannet – fish
- Masked Booby – fish (including flying fish), cephalopods (flying squid)
- Penguins – fish, cephalopods
- Shearwaters – fish, crustaceans

ESTUARIES AND HARBOURS

- Shags – fish (mainly seafloor dwelling fish), marine invertebrates
- Gulls – marine invertebrates, shellfish, fish
- Terns – fish, marine invertebrates
- Australasian Gannet – fish
- Little Penguin – fish

Feeding Strategies



Scavenging: Albatross species, petrels (including giant petrels), shearwaters, gulls and skua

Pattering: Noddies, storm petrels, prions and Red-billed Gull

Piracy: Great Frigatebird, skua species, Masked Booby, also, Kermadec Petrel and Flesh-footed Shearwater

Dipping: Masked Booby, terns, noddies, gulls and Great Frigatebird

Feeding strategies employed by seabirds,
after Harrison, C.S. (1990) in *Seabirds of Hawaii*. Cornell University Press, Ithaca & London

White-faced Storm Petrels, Hauraki Gulf. Photo: Hadoram Shirihai © Tubenoses Project

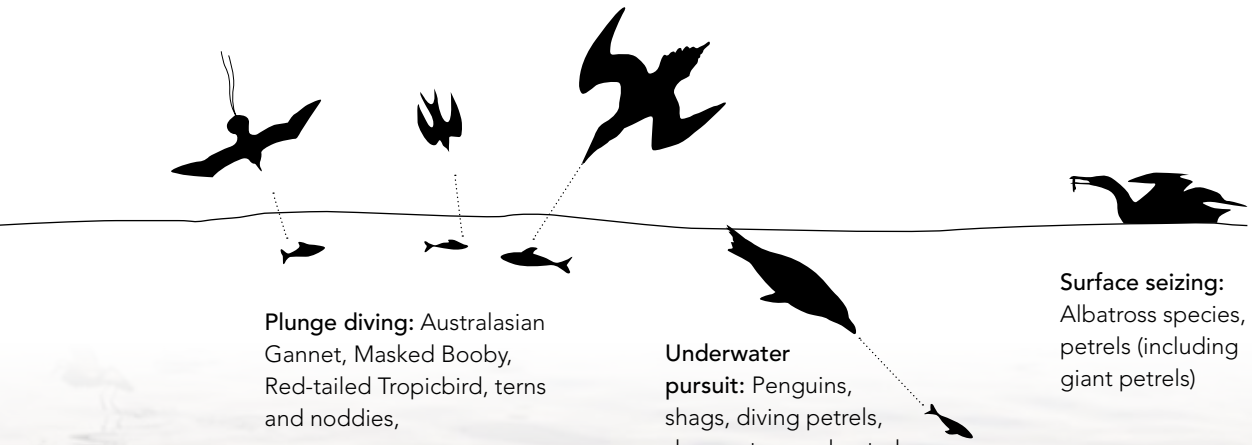
CONTINENTAL SHELF WATERS

- Shags – fish, cephalopods
- Penguins – fish, cephalopods, marine invertebrates
- Shearwaters – fish, cephalopods, marine invertebrates, fisheries discards (some species)
- Petrels – cephalopods, fish, marine invertebrates, fisheries discards (some species)
- Prions – marine invertebrates, small fish, cephalopods
- Diving petrels – marine invertebrates, small fish
- Storm petrels – marine invertebrates, small fish, marine insects
- Australasian Gannet – fish, cephalopods

Photo: Kim Westerskov

PELAGIC WATERS

- Crested penguins – cephalopods, fish
- Albatrosses – cephalopods, fish, marine invertebrates, fish discards
- Petrels – cephalopods, fish, marine invertebrates, fisheries discards (some species)
- Shearwaters – fish, cephalopods, marine invertebrates, fisheries discards (some species)
- Prions – marine invertebrates, small fish, cephalopods
- Diving petrels – marine invertebrates, small fish
- Storm petrels – marine invertebrates, small fish, marine insects, fisheries discards
- Masked Booby – fish (including flying fish), cephalopods (flying squid)
- Tropicbirds – fish, cephalopods
- Sooty Terns – fish, cephalopods



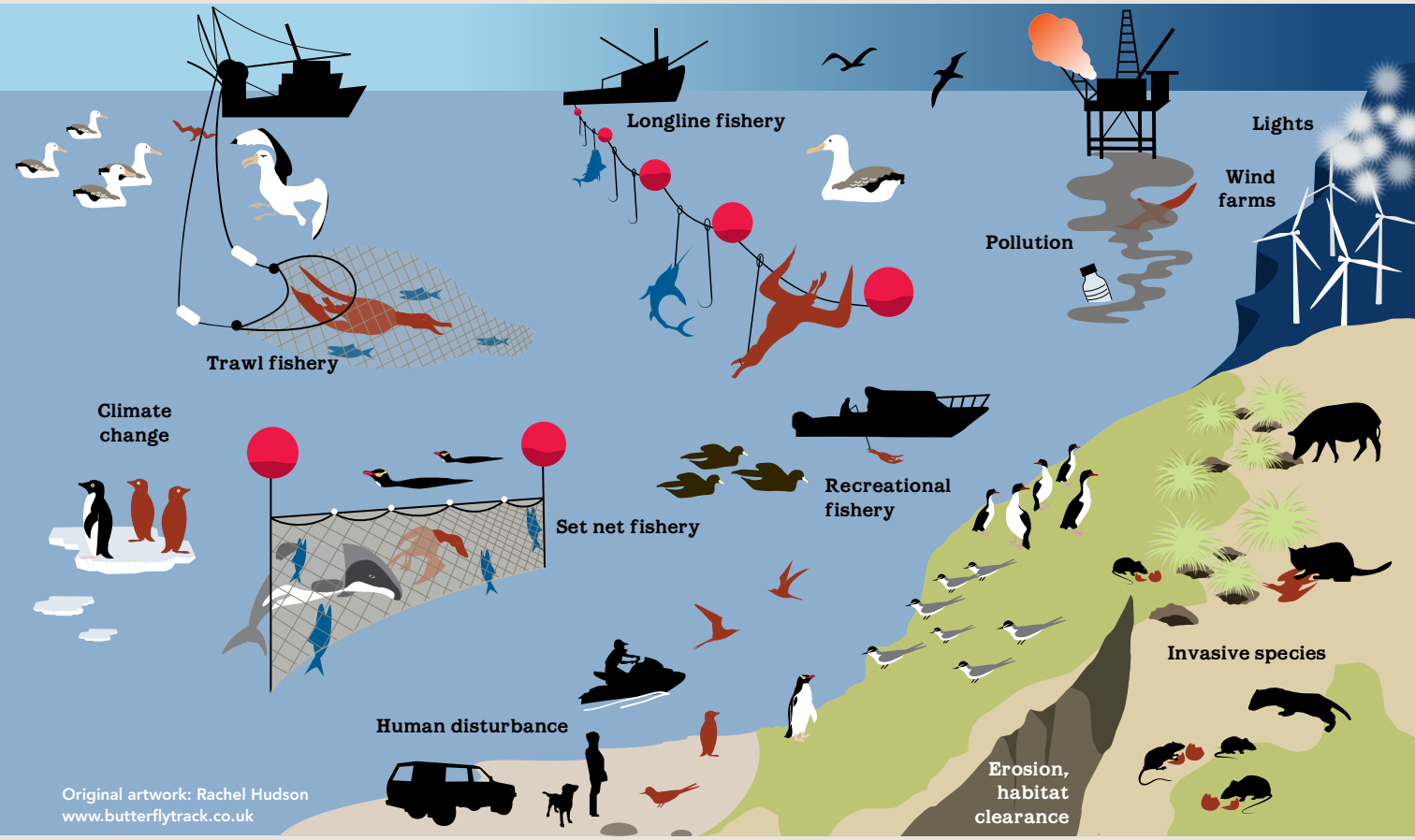
Plunge diving: Australasian Gannet, Masked Booby, Red-tailed Tropicbird, terns and noddies,

Underwater pursuit: Penguins, shags, diving petrels, shearwaters and petrels

Surface seizing: Albatross species, petrels (including giant petrels)

Seabirds Face Threats on Land and at Sea

Seabirds have suffered in the face of a changing world, facing dual pressure both on land and at sea. While large numbers of seabirds have been killed through interactions with fisheries, especially in modern times, it is on land that seabirds have been most vulnerable. As humans spread, inhabiting coastlines or island-hopping across oceans, seabirds have been displaced every step of the way. Destruction of habitat, outright exploitation and introduction of alien species to new environments would result in the local extinction or extirpation of seabird populations. In a few cases, species would disappear forever. Where seabirds survived, it was where the impacts were less; this meant islands for the most part.



THREATS ON LAND

The introduction of alien species to new environments has had probably the greatest impact on seabird populations on a global scale.[61] Changes in distribution and abundance of species have resulted in few breeding on the main islands, and some populations confined to predator-free islands.

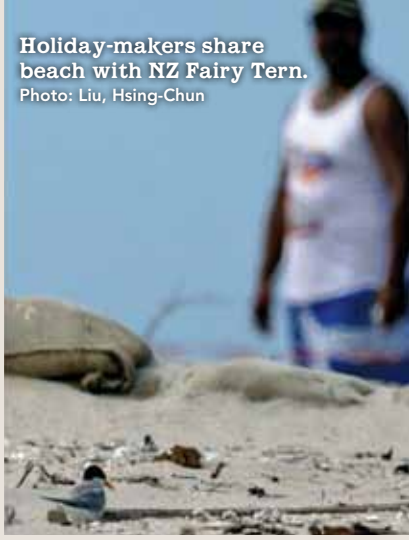
- Seabirds have a number of natural predators on land, mostly avian (eg. Morepork, Weka, Australasian Harrier, Pukeko, Brown Skua, Southern Black-backed (Kelp) Gull), however, NZ fur seals and NZ sea lions can kill or injure some species, particularly penguins.
- Loss of nesting habitat can occur through changes in vegetation, weed encroachment, soil erosion, river and coastal developments. Landslips resulting from presumed heavy rainfall on Antipodes Island in late 2013-early 2014 killed many thousands of White-chinned Petrel adults and chicks.[62] Increased human activity on coasts and

61 Taylor, G.A. 2000a. *Action plan for seabird conservation in New Zealand. Part A: Threatened Seabirds. Threatened Species Occasional Publication 16.* Department of Conservation, Wellington. 234pp.
62 K. Walker, G. Elliott (pers. comm.)

Yellow-eyed Penguin, Otago Peninsula. Photo: Frederic Pelsy

Black-billed Gull shot by vandals, Southland. Photo: Rachel McClellan

Cat-killed Black-winged Petrels, Raoul Island. Photo: DOC



Holiday-makers share beach with NZ Fairy Tern. Photo: Liu, Hsing-Chun

rivers places pressure on seabirds breeding there, and on adjacent estuaries, harbours and inshore waters.[63]

- Competition for nest sites within colonies occurs in dense colonies (eg. gannets, gulls) and between species which may lead to eggs being destroyed, or chicks being removed or killed.
- People visiting places where seabirds are breeding can lead to disturbance, trampling burrows or walking close to or through surface nesting birds, causing them to abandon nests or chicks, or leave chicks vulnerable to avian predators. Boats approaching too close shag, gull or tern colonies during breeding can have the same effect. Dogs that are poorly controlled can kill or maim seabirds, including moulting penguins, and harass roosting and nesting birds.
- In some cases persecution of seabirds occurs, with shags, gulls and penguins being shot or stoned, sometimes en masse as in a few instances with Black-billed Gull in Canterbury and Southland.
- Any fire at a breeding site has the potential to kill seabirds directly, as well as to severely damage their habitat. Many offshore islands can experience long dry periods and the vegetation can become tinder dry. Fires on these remote islands could be devastating, especially if they occur during the breeding season, as all seabirds are vulnerable at that time. The very worst time for a fire to occur is during the incubation period.
- Disease is a periodic threat to all seabirds. Disease outbreaks are often related to extreme climate events where seabirds are put under stress from heat, poor food supplies or reduced water quality. Significant losses have occurred at penguin, albatross and gull colonies. Avian cholera, diphtheria, malaria and botulism have contributed to losses of both adults and young chicks at colonies. Avian pox has been observed on a range of seabirds but doesn't seem to cause widespread mortality.
- Reinvasion by predators, in particular rats, but also cats and mustelids is a constant threat to seabird colonies on offshore islands.
- Seabirds that are nocturnal on and over land are susceptible to being attracted to lights – eg. street and car lights in and around coastal settlements. Young birds departing colonies for the first time are particularly susceptible. The movement of seabirds overland on major flyways (eg. North Auckland Seabird Flyway) needs to be taken into account with regional development of wind farms.
- Harvesting of seabirds in New Zealand (see Tangata Whenua pages 47-48) is tightly regulated. However, illegal mutton-birding is reported to occur resulting in destruction of burrows and exposing islands to other threats such as introduction of pests and predators. Also, questions over sustainability arise if population trends are poorly known, particularly with new threats to seabirds at sea.

63 Gaskin, C.P., Rayner, M.J. 2013. *Seabirds of the Hauraki Gulf: Natural History, Research and Conservation.* Hauraki Gulf Forum, Auckland. 142pp.

Chatham and NZ White-capped Albatrosses. Photo: Jon Irvine

Right: NZ White-capped Albatrosses killed by warp-strike. Photo: Karen Baird

THREATS AT SEA

- A range of marine pollutants enter the marine environment and have the potential to impact seabirds: effluent (sewage), chemical contaminants (pesticides, herbicides, storm-water runoff, heavy metals), plastics and oil and petroleum products.
- Pollutants can impact birds directly, causing death through ingestion of toxic materials or, in the case of oils, through fouling of plumage resulting in the loss of water proofing properties and a loss of ability to fly, feed and keep warm.
- Pollutants can also impact birds indirectly, entering the food chain and accumulating in tissues causing reduced fertility, egg shell thickness and/or chick rearing capacity.
- The negative impacts of plastic debris on seabirds (through entanglement and/or ingestion) are well recognised globally. They often investigate floating debris at sea while foraging and it is possible that some pick up plastic pieces and other debris, which, in turn, could be fed to chicks.
- The threat of oil spill following a shipping accident or from discharges at offshore oil and gas wells can have significant consequences for seabird populations.
- Inshore set nets by recreational and commercial fishers can capture and drown significant numbers of penguins, shags and shearwaters. Marine mammals are also at risk in some areas.
- By-catch of seabirds by commercial fisheries is a major threat to seabird populations. Albatrosses and many petrels are opportunists, attracted to fishing vessels due to the availability of bait, offal or fish discards. Birds target baits when long lines are set, becoming hooked and drowning, or in trawl fisheries where the major cause of mortality is hitting warp cables, and also entanglement in the nets themselves as birds attempt to pull fish out.
- Competition with commercial and recreational fisheries for prey and habitat degradation by fishing practices (ie. bottom trawling) presents a likely but unknown level of threat to seabird populations.
- Seabirds can land or strike ships that are brightly lit at night including fishing vessels and cruise ships, at times found only at destination ports during quarantine searches.
- Flaring on gas and oil rigs are known to attract and kill seabirds.
- Competition with, and habitat depletion by marine development (including fisher-

ies) may also have indirect, adverse effects on protected species, such as depleting their food and modifying the habitat important for all or part of their life cycle and behaviour.

- Seabirds have been killed or harmed intentionally at sea – eg. flesh-footed shearwaters, various shag species – mostly in relation to recreational fishing activities.
- Climate change is affecting marine and terrestrial systems worldwide, with impacts to biotic systems expected to intensify in the coming decades. Ocean warming and increasing stratification could lessen primary productivity, thereby impacting seabird food webs, but this potential effect is poorly understood.
- Approximately 30-50% of global anthropogenic carbon dioxide (CO_2) emissions are absorbed by the world's oceans. Dissolving CO_2 increases the hydrogen ion (H+) concentration in the ocean, and thus reduces ocean pH. How different seabirds will respond to climate and ecosystem changes is related to many factors including their range, foraging behaviour and diet composition, nesting habitat, and life history characteristics; some characteristics may facilitate adaptation whereas others will limit it. In short, some seabird species may fare well in a warming, more acidic ocean world; others may become locally or globally extinct.[64]

64 Young, L., Suryan, R.M., Duffy, D., Sydeman, W.J. 2012. *Climate Change and Seabirds of the California Current and Pacific Islands Ecosystems: Observed and Potential Impacts and Management Implications.* Final Report to the U.S. Fish and Wildlife Service, Region 1

Oiled albatrosses, giant petrel, shearwaters and petrels, *Rena* oil spill, Bay of Plenty. Photo: Kim Westerskov

Plastic fragments found amongst Flesh-footed Shearwater burrows, Ohinau Island, Eastern Coromandel.
Photo: Rachel Buxton

***Rena* oil spill.**
Photo: Kim Westerskov

Flaring on offshore oil rig.
Photo: Fred Dott/Greenpeace

Fluttering shearwaters drowned in a set net, Hauraki Gulf.
Photo: Auckland Council

White-capped Albatross killed by warp. Photo: MPI

Fishing fleet in New Zealand Subantarctic waters. Photo: Kim Westerskov

APPENDIX 1 – NEW ZEALAND BIRD RESOURCES

The following are useful resources for New Zealand seabirds.

New Zealand Birds Online is a searchable encyclopaedia of New Zealand birds. You can find detailed information about all 457 species of New Zealand birds, including all living, extinct, fossil, vagrant and introduced bird species. The database is searchable by name, conservation status, and geographical distribution. Explore the site to read expert-written texts, listen to sound files of bird calls, and browse the many photographs. New Zealand Birds Online is a joint project between Te Papa, OSNZ and DOC.

http://www.nzbirdsonline.org.nz/

eBird is an online bird recording tool to help us understand and document bird occurrence across the landscape: any bird, anywhere, any time. For this reason, every bird-watcher has something to contribute, every time they go birding in New Zealand, both on land and at sea.

http://www.eBird.org/content/newzealand/

BirdingNZ.net is a discussion forum that is free and easy to join, allowing anyone with an interest in NZ birds – resident scientists, international twitchers, or those just looking for help with a bird ID – to find and share information. A key goal of the site is to allow people to quickly and easily distribute details about rare bird observations, so others may also have a chance to see something special.

http://www.BirdingNZ.net/

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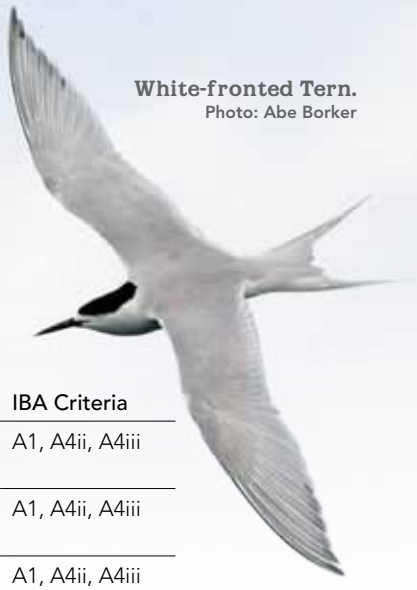
Southern Royal Albatross.
Photo: Abe Borker

APPENDIX 2 – IBAS IDENTIFIED FOR SEABIRDS ON LAND IN NEW ZEALAND



White-fronted Tern.
Photo: Abe Borker

The following IBA Criteria have been applied:
A1 – Threshold numbers of one or more globally threatened species
A4ii – 1% global population
A4iii – 10,000 pairs, seabirds or 20,000 individuals, water birds
A4iv – migration bottleneck sites

Code	Site Name	Site Location	Central coordinates		IBA Criteria
NZ001	Meyer Herald Islands	Kermadec Islands	-29.246137	-177.865997	A1, A4ii, A4iii
NZ002	Macauley Haszard Islands	Kermadec Islands	-30.228984	-178.435098	A1, A4ii, A4iii
NZ003	Curtis Cheeseman Islands	Kermadec Islands	-30.542768	-178.556548	A1, A4ii, A4iii
NZ004	Manawatawhi Three Kings Islands	North Auckland	-34.156089	172.130128	A1, A4ii, A4iii
NZ005	Poor Knights Islands	Hauraki Gulf	-35.484001	174.736170	A1, A4ii, A4iii
NZ006	Marotere Chickens Islands	Hauraki Gulf	-35.887764	174.753900	A1, A4ii, A4iii
NZ007	Taranga Hen Island	Hauraki Gulf	-35.964306	174.707502	A1, A4ii, A4iii
NZ008	Mokohinau Islands	Hauraki Gulf	-35.906695	175.114640	A4iii
NZ009	Waipu Estuary	Hauraki Gulf	-35.994798	174.483699	A1, A4ii
NZ010	Mangawhai Estuary	Hauraki Gulf	-36.086964	174.596309	A1, A4ii
NZ011	Kaipara Harbour	North Auckland	-36.383881	174.243456	A1, A4ii, A4iii
NZ012	Papakanui Spit	North Auckland	-36.432056	174.200935	A1, A4ii
NZ013	Muriwai	West Auckland	-36.833333	174.424868	A4ii
NZ014	Te Hauturu-o-Toi Little Barrier Island	Hauraki Gulf	-36.197103	175.078763	A1, A4ii, A4iii
NZ015	Pakiri Beach	Hauraki Gulf	-36.241281	174.721278	A1, A4ii
NZ016	North Auckland Seabird Flyway	North Auckland	-36.445314	174.455638	A1, A4ii, Aiv
NZ017	Hirakimata Aotea Peninsula	Hauraki Gulf	-36.186435	175.412816	A1, A4ii
NZ018	Mahuki Island	Hauraki Gulf	-36.228646	175.302352	A4ii
NZ019	Horuhoru Rock	Hauraki Gulf	-36.723391	175.170344	A4ii
NZ020	Firth of Thames	Hauraki Gulf	-37.212832	175.428314	A1, A4ii, A4iii
NZ021	Manukau Harbour	South Auckland	-37.069971	174.722443	A1, A4ii, A4iii
NZ022	Motukawao	Hauraki Gulf	-36.679521	175.393976	A4ii
NZ023	Repanga Cuvier island	East Coromandel	-36.432677	175.770521	A1, A4ii
NZ024	Mercury Islands	East Coromandel	-36.641136	175.887674	A1, A4ii, A4iii
NZ025	Ruamaahua Aldermen Islands	East Coromandel	-36.958587	176.080364	A1, A4ii, A4iii
NZ026	Bay of Plenty Islands	Bay of Plenty	-37.855542	176.974640	A1, A4ii, A4iii
NZ027	Maketu	Bay of Plenty	-37.755108	176.450901	A1, A4ii
NZ028	Rotorua Sulphur Point	Bay of Plenty	-38.140092	176.261387	A1
NZ029	Gannet Island Karewa	Waikato	-37.972282	174.565973	A4ii
NZ030	Cape Kidnappers	Hawke's Bay	-39.644957	177.091610	A4ii
NZ031	Wairarapa Moana Ruamahanga	Wairarapa	-41.254839	175.258472	A1

NZ032	Farewell Spit	Northwest Nelson	-40.559461	173.036728	A1, A4ii
NZ033	Takapourewa Stephens Island	Marlborough Sounds	-40.670599	173.996309	A1, A4ii, A4iii
NZ034	Trio Islands	Marlborough Sounds	-40.826720	174.001202	A1, A4ii
NZ035	Rahuinui Island	Marlborough Sounds	-40.881578	173.765682	A1, A4ii
NZ036	Tekuru Kuru Island	Marlborough Sounds	-40.888294	173.897861	A1, A4ii
NZ037	Sentinel Rock	Marlborough Sounds	-40.881903	174.141106	A1, A4ii
NZ038	Duffer's Reef	Marlborough Sounds	-40.954673	174.040812	A1, A4ii
NZ039	Tawhitinui Bay	Marlborough Sounds	-41.043000	173.955770	A1, A4ii
NZ040	White Rocks	Marlborough Sounds	-41.077493	174.361261	A1, A4ii
NZ041	Long Island	Marlborough Sounds	-41.112145	174.285994	A4ii
NZ042	The Brothers Islands	Cook Strait	-41.103350	174.441905	A4iii
NZ043	Motueka River	Nelson	-41.387241	172.815542	A1
NZ043	Motueka Spit	Nelson	-41.100440	173.029261	A1
NZ044	Upper Buller	Buller	-41.790769	172.321587	A1
NZ045	Wairau River	Marlborough	-41.717518	173.095264	A1
NZ046	Wairau Lagoons	Marlborough	-41.505492	174.058113	A1, A4ii
NZ047	Awatere River	Marlborough	-41.658678	174.076996	A1
NZ048	Lake Grassmere	Marlborough	-41.722002	174.160767	A1, A4iii
NZ049	Clarence River mouth	Kaikoura	-42.160031	173.909798	A1
NZ050	Clarence Acheron Saxton Rivers	Marlborough	-42.393291	172.968235	A1
NZ051	Ka Whata Tu o Rakihouia/Kaikoura	Kaikoura	-42.310323	173.718567	A1
NZ052	Kahutara River	Kaikoura	-42.434036	173.588405	A1
NZ053	Punakaiki	North Westland	-42.092030	171.337832	A1, A4ii
NZ054	Waiau River	Canterbury	-42.584117	172.782755	A1, A4ii
NZ055	Hurunui River	Canterbury	-42.872442	172.768593	A1, A4ii
NZ056	Motunau	Canterbury	-43.061506	173.076848	A4iii
NZ057	Pegasus Bay Coast	Canterbury	-43.391577	172.702589	A1, A4ii, A4iii
NZ058	Ashley River	Canterbury	-43.229195	172.229576	A1
NZ059	Waimakariri River	Canterbury	-43.005651	171.746693	A1, A4ii
NZ060	Banks Peninsula	Canterbury	-43.763661	173.130352	A1, A4ii, A4iii
NZ061	Te Waihora	Canterbury	-43.787553	172.487823	A1, A4ii, A4iii
NZ062	Rakaia River	Canterbury	-43.305194	171.379852	A1, A4ii
NZ063	Ashburton River	Canterbury	-43.910953	171.739311	A1, A4ii
NZ064	Rangitata River	Canterbury	-43.668865	170.969238	A1
NZ065	Orari River	Canterbury	-44.129616	171.306862	A1
NZ066	Opihi River	Canterbury	-44.191996	171.043233	A1
NZ067	Waitaki River	Canterbury	-44.928155	171.100456	A1
NZ068	Godley Cass Rivers	Canterbury	-43.782670	170.525442	A1, A4ii
NZ069	Tasman River	Canterbury	-43.905610	170.175116	A1, A4ii

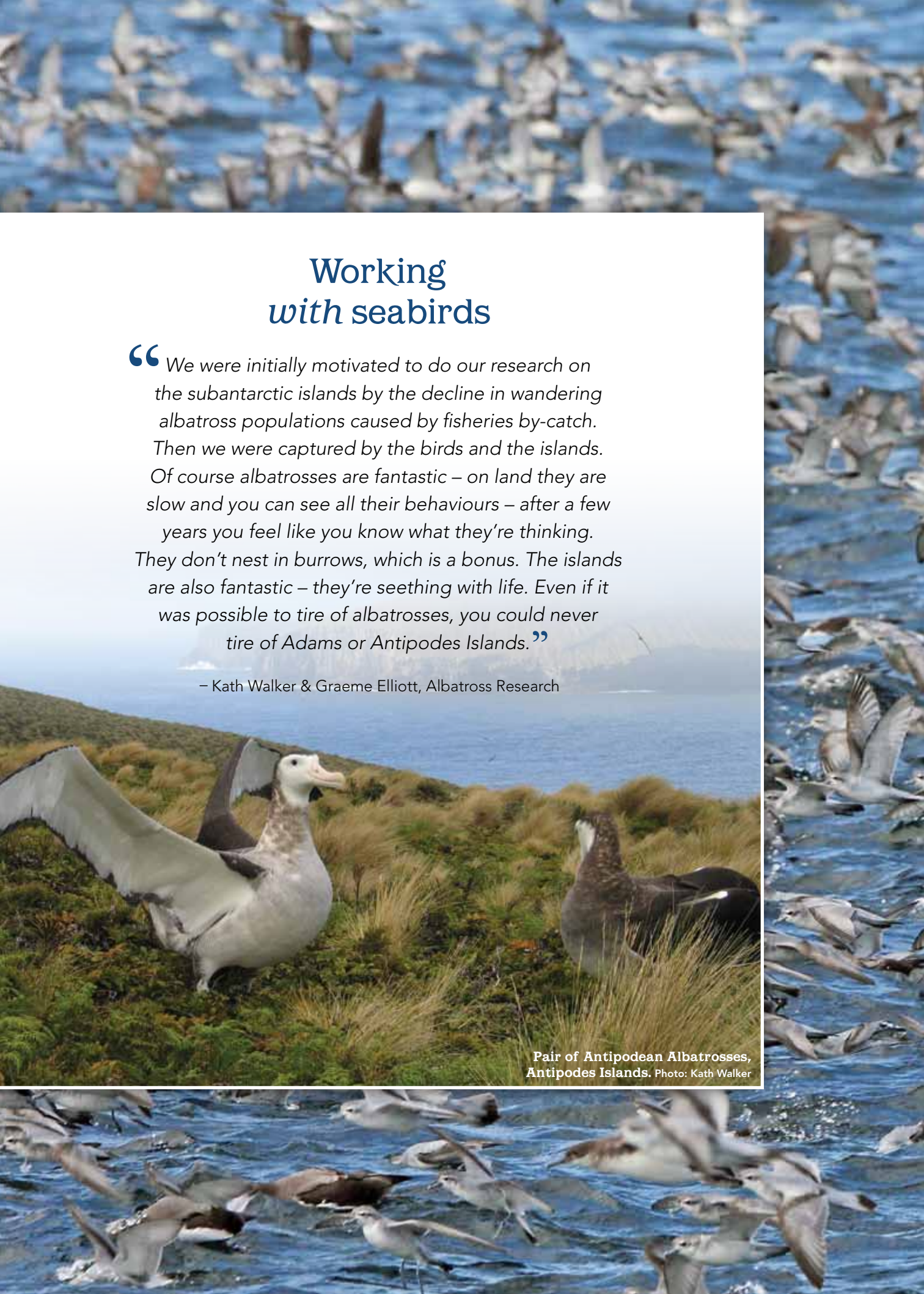
NZ070	Hopkins Dobson Rivers	Canterbury	-44.106878	169.874554	A1
NZ071	Ohau Pukaki Tekapo Rivers	Canterbury	-44.313335	170.231712	A1, A4ii
NZ072	Ahuriri River	Canterbury	-44.470296	169.988365	A1, A4ii
NZ073	Heretaniwha Point Waterfall Creek	South Westland	-43.587713	169.456424	A1, A4ii
NZ074	Whakapohai	South Westland	-43.713101	169.224767	A1, A4ii
NZ075	Open Bay Islands	South Westland	-43.860635	168.884491	A1, A4ii
NZ076	Jackson Head	South Westland	-43.960157	168.622107	A1, A4ii
NZ077	Cascade	South Westland	-44.005904	168.485470	A1, A4ii
NZ078	Hope River	South Westland	-44.088078	168.321190	A1, A4ii
NZ079	Awarua Point	South Westland	-44.258864	168.054165	A1, A4ii
NZ080	Martins Bay	South Westland	-44.329620	167.997522	A1, A4ii
NZ081	Yates Point	South Westland	-44.496675	167.817101	A1, A4ii
NZ082	North Otago Coast	North Otago	-45.122015	170.979761	A1, A4ii
NZ083	Moeraki Katiki Point	North Otago	-45.392140	170.866585	A1, A4ii
NZ084	Aramoana Otago Harbour	Dunedin	-45.786978	170.717497	A1, A4ii
NZ085	Taiaroa Head	Dunedin	-45.775216	170.727668	A1, A4ii
NZ086	Otago Peninsula	Dunedin	-45.876720	170.732344	A1, A4ii
NZ087	Lower Clutha River Mata-Au	South Otago	-45.818571	169.527283	A1
NZ088	Hunter River	West Otago	-44.277286	169.457932	A1
NZ089	Makarora	West Otago	-44.273783	169.185591	A1
NZ090	Matukituki River	West Otago	-44.481075	168.819695	A1
NZ091	Dunstan Upper Clutha River	Central Otago	-44.932603	169.257946	A1
NZ092	Dart Rees Rivers	West Otago	-44.773793	168.325396	A1, A4ii
NZ093	Greenstone Caples Rivers	West Otago	-44.932238	168.327370	A1
NZ094	Nevis River	Central Otago	-45.174293	168.996162	A1
NZ095	Manuherikia	Central Otago	-44.855838	169.916353	A1
NZ096	Catlins Coast	South Otago	-46.605170	169.444885	A1, A4ii
NZ097	Mataura River	Southland	-45.880688	168.799610	A1
NZ098	Bluff Harbour Awarua Bay	Southland	-46.568007	168.330545	A1, A4ii
NZ099	Omaui Island Oreti Estuary	Southland	-46.515051	168.219566	A1, A4ii
NZ100	Oreti River	Southland	-45.716668	168.430796	A1, A4ii
NZ101	Aparima River	Southland	-46.033113	168.112707	A1, A4ii
NZ102	Waiau River Southland	Southland	-45.794459	167.631111	A1, A4ii
NZ103	Mararoa River	Southland	-45.542367	167.887487	A1
NZ104	Whitestone River	Southland	-45.460913	167.788439	A1
NZ105	Eglington River	Fiordland	-45.054242	167.987652	A1
NZ106	Milford Sound Piopiotahi	Fiordland	-44.623098	167.911949	A1, A4ii
NZ107	George Sound	Fiordland	-44.967227	167.413273	A1
NZ108	Charles Sound	Fiordland	-45.097519	167.141533	A1
NZ109	Doubtful Sound	Fiordland	-45.291192	166.912708	A1, A4ii
NZ110	Breaksea Sound	Fiordland	-45.577162	166.637278	A1, A4ii

NZ111	Dusky Sound Wet Jacket Arm	Fiordland	-45.751654	166.547585	A1
NZ112	Chalky Preservation Inlets	Fiordland	-46.050242	166.528873	A1, A4ii
NZ113	Raratoka Centre Island	Foveaux Strait	-46.457964	167.846203	A1
NZ114	Ruapuke	Foveaux Strait	-46.737818	168.532757	A1
NZ115	Fife Rock	Foveaux Strait	-46.795829	168.388138	A1, A4ii
NZ116	Solander Islands	Foveaux Strait	-46.573216	166.895064	A1, A4ii, A4iii
NZ117	Whenua Hou Codfish Island	Rakiura	-46.769322	167.843642	A1, A4ii, A4iii
NZ118	Northern Titi Muttonbird Islands	Rakiura	-46.907891	168.239311	A1, A4ii, A4iii
NZ119	North Coast Rakiura	Rakiura	-46.683504	167.869171	A1, A4ii
NZ120	Paterson Inlet The Neck	Rakiura	-46.953858	168.129773	A1
NZ121	Port Adventure	Rakiura	-47.096971	168.220047	A1, A4ii, A4iii
NZ122	Port Pegasus	Rakiura	-47.224371	167.651745	A1, A4ii
NZ123	Southern Titi Muttonbird Islands	Rakiura	-47.232951	167.426182	A1, A4ii, A4iii
NZ124	Tuku	Chatham Islands	-44.075130	-176.640072	A1, A4ii
NZ125	Main Chatham	Chatham Islands	-43.705360	-176.634407	A1, A4ii
NZ126	Rangiauria Pitt Island	Chatham Islands	-44.226983	-176.221610	A1, A4ii
NZ127	Rangatira South East Island	Chatham Islands	-44.350171	-176.180926	A1, A4ii, A4iii
NZ128	Mangere	Chatham Islands	-44.240082	-176.280919	A1, A4ii, A4iii
NZ129	The Pyramid Tarakoikoia	Chatham Islands	-44.432722	-176.280919	A1, A4ii
NZ130	Forty Fours Motuhara	Chatham Islands	-43.962536	-175.834428	A1, A4ii
NZ131	Star Keys Motuhope	Chatham Islands	-44.223169	-176.013986	A1, A4ii
NZ132	The Sisters Rangitatahi	Chatham Islands	-43.563787	-176.814222	A1, A4ii
NZ133	Bounty Islands	NZ Subantarctic Islands	-47.751200	179.024443	A1, A4ii, A4iii
NZ134	Antipodes Islands	NZ Subantarctic Islands	-49.684528	178.781070	A1, A4ii, A4iii
NZ135	Snares Islands	NZ Subantarctic Islands	-48.030231	166.581144	A1, A4ii, A4iii
NZ136	Western Chain	NZ Subantarctic Islands	-48.053874	166.503124	A1, A4ii, A4iii
NZ137	Enderby Group	NZ Subantarctic Islands	-50.525705	166.274815	A1, A4ii, A4iii
NZ138	Main Auckland Island	NZ Subantarctic Islands	-50.823060	166.148209	A1, A4ii, A4iii
NZ139	Disappointment Island	NZ Subantarctic Islands	-50.607225	165.964445	A1, A4ii, A4iii
NZ140	Adams Island	NZ Subantarctic Islands	-50.896092	166.303047	A1, A4ii, A4iii
NZ141	Campbell Islands	NZ Subantarctic Islands	-52.550433	169.165544	A1, A4ii, A4iii

Working *with* seabirds

“We were initially motivated to do our research on the subantarctic islands by the decline in wandering albatross populations caused by fisheries by-catch. Then we were captured by the birds and the islands. Of course albatrosses are fantastic – on land they are slow and you can see all their behaviours – after a few years you feel like you know what they’re thinking. They don’t nest in burrows, which is a bonus. The islands are also fantastic – they’re seething with life. Even if it was possible to tire of albatrosses, you could never tire of Adams or Antipodes Islands.”

– Kath Walker & Graeme Elliott, Albatross Research



Pair of Antipodean Albatrosses, Antipodes Islands. Photo: Kath Walker

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