# SIGNIFICANT NATURAL AREAS

# TIMARU DISTRICT

**A REPORT ON A DISTRICT-WIDE SURVEY OF AREAS OF SIGNIFICANT INDIGENOUS VEGETATION AND SIGNIFICANT HABITATS OF INDIGENOUS FAUNA**

**A report to**

## TIMARU DISTRICT COUNCIL

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**July 2016**

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# EXECUTIVE SUMMARY

This report presents the results of a survey of significant natural areas (SNAs) in Timaru District. The survey was undertaken between 2005 and 2016 by Mike Harding, an independent ecologist contracted to Timaru District Council. The purpose of the survey is to assist Council to meet its Resource Management Act 1991 obligations to provide protection for areas of significant indigenous vegetation and significant habitats of indigenous fauna.

Timaru District is in South Canterbury, within Canterbury Region. It is bounded to the north by Rangitata River, to the south by Pareora River, to the east by the coast, and to the west by the main divide of the Southern Alps. It is characterized by low-altitude plains, rolling hill country (downlands), foothills, and the high mountains and broad floor of the upper Rangitata valley.

At completion of the survey in 2016, 772 SNAs covering a total area of 7260 hectares had been surveyed and mapped. More than 200 properties were assessed during the survey, including small lifestyle blocks, roadsides, low country farms, large hill country farms and high country stations. Nearly all (95%) of the properties were assessed by field survey. Ten other properties were assessed by desk-top analysis of available information, in consultation with the landowners.

The significance of the surveyed vegetation and habitat was assessed against ecological criteria in the Timaru District Plan and, in the latter part of the survey, ecological assessment criteria in the Canterbury Regional Policy Statement.

The SNAs cover a wide range of habitats, including coastal wetland, lowland grassland, limestone scarp, basalt boulderfield, downlands forest, old-growth podocarp forest in foothills valleys, regenerating forest on hill slopes, inland wetlands and tussockland on moraine. Within these SNAs are populations of nine 'threatened' and 21 'at risk' plant and animal species, including long-tailed bat and a locally-endemic limestone gentian.

The main threats to SNAs are plant pests (such as sycamore, old man's beard, Darwin's barberry and Chewings fescue), animal pests (notably possums, wallabies, feral pigs and feral cats), grazing and clearance. Most landowners are interested in the value of vegetation and habitat on their properties, intrigued to learn that it is regarded as important for the District, and proud if there are threatened or notable species present.

These SNAs define the natural character of Timaru District. They are remnants of previously widespread areas of vegetation and habitat. Many are small, isolated, poorly buffered and modified by plant and animal pests. Some are threatened by land-use change. Management and protection of these SNAs is urgent.

Opportunities for protection of SNAs are District Plan provisions (rules), protection by other agencies (e.g. QEII National Trust), advice and advocacy to landowners, and support for landowners' management and protection initiatives. Most landowners are receptive to protection of SNAs on their properties. It is recommended that this landowner interest is encouraged and supported, with District Plan rules and monitoring providing a backstop for protection.

Priorities for protection are those SNAs which contain vegetation at lowland alluvial sites (herbfield, grassland, shrubland, forest and wetland), vegetation on limestone bluffs, old-growth forest on river terraces, inland wetlands, shrubland and regenerating forest on dry hill slopes, and habitats for threatened animal species.

# 1. INTRODUCTION

This report presents the results of a survey of significant natural areas (SNAs) in Timaru District, South Canterbury. The survey was undertaken over an eleven-year period between 2005 and 2016. The purpose of the survey is to identify areas of "significant indigenous vegetation and significant habitats of indigenous fauna" in accordance with Section 6(c) Resource Management Act 1991. The objective of the survey is to assist Council to implement provisions of the Timaru District Plan (2005). This report was prepared by Mike Harding, an independent ecologist contracted by Timaru District Council to undertake the SNA survey. Opinions and recommendations expressed in this report are those of Mike Harding and should not be assumed to represent the views of Timaru District Council.

# 2. BACKGROUND

The Resource Management Act 1991 (Section 6(c)) requires territorial authorities to "provide for the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna" as a matter of national importance. A range of approaches have been used by Councils throughout New Zealand to meet this obligation.

Timaru District Council identified SNAs during preparation of the Timaru District Plan (2005). These SNAs were selected from published reports, aerial photographs and local knowledge. Council received objections to the inclusion of a schedule of sites (SNAs) in the District Plan. To assist in the resolution of these objections Council assembled key stakeholders together as a Rural 3 Zone Working Party. The outcome of Working Party discussions was removal of the listed sites from the proposed District Plan and introduction of a method for identification of SNAs:

*To provide interim Definitions of Significant Indigenous Vegetation and Significant Habitats of Indigenous Fauna (refer Table B2), and will endeavour to carry out property assessments within five years of the plan becoming operative in consultation with landowners to determine significant areas using the following procedure and criteria* (Method 7, Part B2, Timaru District Plan).

The existing District Plan protects areas of significant vegetation and habitat through Rule 4.1, which lists clearance as a non-complying activity: "*Clearance by any means (including burning and spraying with herbicides) or over-planting of significant indigenous vegetation and significant habitats of indigenous fauna*" (Part D8, Timaru District Plan).

This report presents the results of implementation of the second part of Method 7 (Part B2) of Timaru District Plan, i.e. the identification of SNAs by property assessments through a District-wide survey. This survey and the property assessments were arranged and undertaken by Mike Harding, an independent South Canterbury ecologist, under contract to Timaru District Council.

# 3. DESCRIPTION OF TIMARU DISTRICT

Timaru District is in South Canterbury, within Canterbury Region in the South Island of New Zealand. It shares boundaries with Ashburton District at the Rangitata River to the north, Mackenzie District to the west, and Waimate District at the Pareora River to the south. It extends from the coast to the main divide of the Southern Alps at the head of the Rangitata valley.

Timaru District covers all of Geraldine Ecological District (ED) and parts of Low Plains, Makikihi, Waimate, Fairlie, Orari, Hakatere, Two Thumb and Armoury ecological districts (McEwen, 1987). An ecological district is a local part of New Zealand where the topographical, geological, climatic, soil and biological features produce a characteristic landscape and range of biological communities (Park *et al*, 1983). New Zealand is divided into 268 ecological districts.

Low altitude parts of Timaru District lie within the Eastern South Island Plains (N) and Southern Lowlands (L) Level I land environments; higher-altitude inland parts lie with Southeastern Hill Country (Q) and Central Mountains (P) land environments. Land Environments of New Zealand (LENZ) is a classification of New Zealand's landscapes using a comprehensive set of climate, landform and soil variables chosen for their roles in driving geographic variation in biological patterns. New Zealand is divided into 20 Level I land environments (Leathwick *et al*, 2003).

*South Canterbury coast*

Aside from the formal land classification frameworks (EDs and LENZ), there are four broad land types within Timaru District: low-altitude plains; rolling hill country (downlands); foothills ranges; and the high mountains of the upper Rangitata valley. The plains comprise extensive free-draining gravels between the coast and the downlands and foothills. The downlands comprise two basalt landforms (Timaru Downs and Geraldine Downs) and low hills of limestone and other sedimentary rock. The downlands are lowland (mostly less than 300m altitude) and are covered in a deep layer of loess (wind-blown silt).

*Foothills of the Tara Haoa (Mt Peel) Range*

The foothills rise from the plains and downlands to more than 1600m altitude on the Four Peaks and 1700m on the Tara Haoa (Mt Peel) Range. The foothills are dissected by the Hae Hae Te Moana, Waihi and Orari rivers and their tributaries. The high mountains part of the District is dominated by the Ben McLeod, Sinclair and Black ranges, the extensive lateral moraine between Forest Creek and Bush Stream, and the floodplain of the Rangitata River.

The original vegetation on the plains was most probably matai-totara (*Prumnopitys taxifolia-Podocarpus totara*) forest on deeper finer soils, kahikatea (*Dacrycarpus dacrydioides*) forest at poorly-drained sites, and danthonia (*Rytidosperma*) grassland on recently deposited gravels. Elsewhere there was likely a mosaic of kanuka (*Kunzea ericoides*) forest, kowhai-cabbage tree (*Sophora microphylla-Cordyline australis*) treeland, matagouri (*Discaria toumatou*) shrubland, silver tussock (*Poa cita*), fescue tussock (*Festuca novae-zelandiae*), freshwater wetlands and saline (coastal) wetlands (Steven and Meurk, 1996).

*Remnant shrubland on the plains*

*Forest remnants on the Geraldine Downs*

The downlands are likely to have been dominated by hardwood forest with emergent podocarps: matai, totara and kahikatea. Dominant hardwood trees were broadleaf (*Griselinia littoralis*), narrow-leaved lacebark (*Hoheria angustifolia*), lowland ribbonwood (*Plagianthus regius*), mahoe (*Melicytus ramiflorus*), five-finger (*Pseudopanax arboreus*), lancewood (*Pseudopanax crassifolius*), marbleleaf (*Carpodetus serratus*), kohuhu (*Pittosporum tenuifolium*), lemonwood (*Pittosporum eugenioides*), kaikomako (*Pennantia corymbosa*), fuchsia (*Fuchsia excorticata*), wineberry (*Aristotelia serrata*) and mapou (*Myrsine australis*). Wetland vegetation was present on valley floors and a specialized flora on limestone and basalt bluffs.

*Old-growth podocarp forest, foothills valley*

Forest on the lower foothills was similar to that described above though without kaikomako and lowland ribbonwood and probably with fewer podocarps. Additional canopy species were narrow-leaved mahoe (*Melicytus lanceolatus*), yellowwood (*Coprosma linariifolia*), three-finger (*Pseudopanax colensoi*) and mountain ribbonwood (*Hoheria lyallii*). This forest graded to low-canopied hardwood forest then scrub on upper slopes. Patches of mountain beech (*Fuscospora cliffortioides*) forest were present, more commonly further inland, and patches of southern rata (*Metrosideros umbellata*) forest on dry ridges and rocky slopes. Inland valleys supported mixed podocarp-hardwood forest dominated by mountain totara (*Podocarpus laetus*), celery pine (*Phyllocladus alpinus*), *Hoheria glabrata*, inaka (*Dracophyllum* species) and, at some locations, mountain cedar (*Libocedrus bidwillii*) (Burrows and Wilson, 2008).

Today, indigenous vegetation at low altitude parts of Timaru District is substantially depleted. The plains are almost entirely developed for agriculture and are occupied by the towns of Temuka, Geraldine and Pleasant Point. Most parts of the downlands are also developed, with the city of Timaru extending across a substantial portion of the Timaru Downs and lifestyle blocks across the Geraldine Downs. A few, mostly small, areas of remnant indigenous vegetation, and numerous areas of regenerating vegetation, are present in gullies and on steep (mostly south-facing) slopes.

*Havelock River, upper Rangitata valley*

Larger remnants of indigenous forest and extensive areas of regenerating forest and scrub are present in foothills valleys. Higher slopes support modified indigenous vegetation, dominated by tussockland and shrubland. River flats and lower slopes of the Rangitata valley are modified, though areas of sedgeland (wetland), tussockland and herbfield remain.

Headwater valleys, higher altitude and alpine sites are relatively intact, apart from the effects of ubiquitous introduced animals such as possums, hares, deer, chamois and tahr.

A number of threatened and at risk plant and animal species are present in Timaru District. The District is also the stronghold or distribution limit for several plant species. These are discussed further in section 8 of this report.

*Limestone bluffs, Totara Valley*

# 4. PROPERTY SURVEYS

## 4.1 Identification of Potential SNAs

Potential areas of significant indigenous vegetation were identified from existing schedules, viewing of stereoscopic aerial photographs, local knowledge and a road-based inspection of most parts of the district. Potential significant habitats of indigenous fauna were more difficult to determine and were identified from available information and local knowledge.

More than 700 areas of indigenous vegetation and habitat were identified for survey at the commencement of the project. A number of these sites were assessed as not significant, either through field survey or because, as the survey progressed, the attributes required to meet the significance criteria were better understood. A considerable number of new sites were discovered and assessed during the eleven years of survey. Many of these were sites that are hidden from public view. Others were sites at which the significance of the attributes became apparent during the survey, at least in part due to new information.

## 4.2 Survey Access

The success of this type of ecological survey relies on access to sites on privately-owned land. Landowners are often suspicious of Council's intentions and concerned at the implications of identification of SNAs on their properties. Common concerns are that landowners will be required to fence, de-stock, manage or provide public access to areas identified as SNAs. Furthermore, some landowners are distrustful of Council; a view usually arising from a previous dispute.

Access to properties in Timaru District was made easier because of the existing District Plan provisions. Most areas of indigenous vegetation meet the Interim Definitions and are therefore already protected from clearance by Rule 4.1. The purpose of the survey was to clarify which of these areas were significant when assessed against ecological criteria in Part B2 (Method 7) of Timaru District Plan. While many landowners were unaware of the District Plan clearance rule or the District-wide survey, most could see the benefit of clarifying the location and extent of SNAs.

*Arowhenua Bush, a rare remnant of plains forest*

At the commencement of this survey, a small number of landowners were sent a letter outlining the purpose of the survey and seeking permission for access. This was only partly successful. In some cases landowners misread or misinterpreted the intention of the letter and were already suspicious when they were later contacted by telephone. In response, the landowner contact method was changed to a personal approach by telephone or visit. This "cold calling" method was more successful because any concerns raised by the landowner could be addressed immediately and a clearer explanation of the purpose of the survey provided.

Properties were surveyed by geographic area, i.e. where possible, all properties with potential SNAs in one part of the District were surveyed over one continuous period. This tended to generate community interest in and understanding of the SNA survey, easing landowners' concerns and assisting with access to properties. Building this trust with landowners was assisted by the fact that the person contacting landowners and undertaking the surveys (Mike Harding) was a local resident and was independent of Council.

Surveys of a small number of properties were prompted by land-use consent applications. In these situations Council offered to assess the significance of affected areas as part of a property-wide survey of SNAs. Surveys of a small number of properties were prompted by requests from landowners.

Towards the end of the project, ten property owners continued to refuse access for surveys. SNAs on these ten properties were assessed from desk-top analysis of aerial photographs and survey data from adjacent properties. This process was discussed with landowners and any comments on draft property reports were addressed.

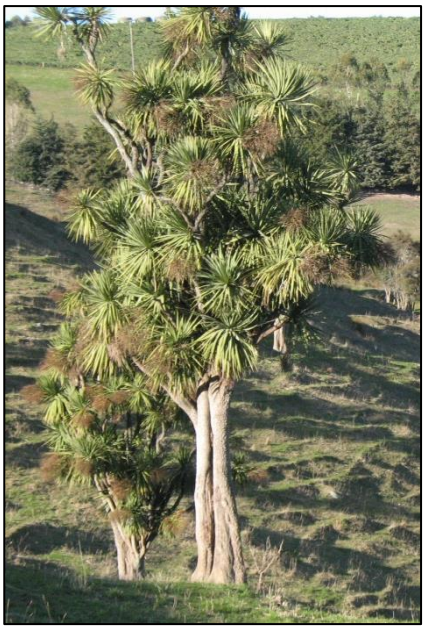
*Indigenous vegetation on basalt bluffs, Timaru Downs*

## 4.3 Survey Method

Once permission for access to a property was obtained, the whole property was assessed for potential SNAs. Landowners were invited to participate in the survey and surveys were arranged at times suitable to landowners if required. Most landowners did not participate in the field survey, though every effort was made to meet with landowners at the time of the survey.

Survey effort on each property was guided by study of recent aerial images and knowledge of the flora and fauna likely to be present in the local plant communities and habitats. Particular effort was directed to survey of vegetation in 'threatened' or 'at risk' Land Environments, as defined by Walker *et al* (2006), and 'historically rare' ecosystems as defined by Williams *et al* (2007) and especially those listed as threatened (Holdaway *et al*, 2012). As the project progressed it became easier to predict which areas of vegetation or habitat were likely to be significant.

The site surveys were not exhaustive: there were insufficient funds and time to permit that level of survey effort. Instead, sites were sampled to the extent necessary to determine whether vegetation or habitat at the site was significant. All plant communities at a site and all likely habitats of 'threatened' and 'at risk' species were inspected, wherever possible. Most sites were surveyed only once in whatever conditions were prevailing at the time, though most survey work was undertaken during favourable weather. Surveys of sites with cryptic or seasonal plant species (e.g. limestone scarps and lowland grasslands) were undertaken wherever possible during summer months.



*Cabbage trees provide roosting and breeding habitat for long-tailed bat*

Site surveys were primarily surveys of vegetation. Observations of indigenous fauna were recorded but, at most sites, no substantial additional effort was spent surveying fauna. Exceptions were survey of long-tailed bat (*Chalinolobus tuberculatus* "South Island") and blue duck (*Hymenolaimus malacorhynchos*), both 'threatened' species with notable populations in Timaru District, and the provision of information on lizards and micro-snails at some sites.

The distribution of long-tailed bats in South Canterbury was documented just prior to commencement of the SNA survey (O'Donnell, 2000), so the significance of vegetation as habitat for long-tailed bats was more easily assessed. There were occasional sightings of blue ducks in foothills valleys at commencement of the SNA survey. So, the main foothills streams within Timaru District were surveyed for blue ducks and significant habitats identified during the early part of the SNA project. At some sites, information about lizards was provided by Hermann Frank and observations of micro-snails by Julie Brown.

*Blue duck habitat in foothills streams*

Vegetation at sites was surveyed using the unbound RECCE plot method described by Allen (1992), in which the percentage cover of each plant species is assessed in each height tier (i.e. canopy, understorey and ground). Additional plant species observed outside sample plots were recorded. The presence and location of 'threatened', 'at risk' and locally-uncommon species were also recorded. Trunk diameters (at breast height) of larger trees were measured. Plant communities and notable species were photographed. Vegetation was described using the definitions proposed by Atkinson (1985).


*Microsnails*

The boundaries of significant sites (SNAs) were delineated on colour aerial photographic images, following the field survey. Determination of these boundaries was at times assisted by recording boundary points by hand-held GPS. It was impractical to traverse and GPS-track most SNA boundaries. Therefore, SNA boundaries follow obvious vegetation, landform or property boundaries. SNAs were defined as areas of similar vegetation and/or habitat. If areas of different vegetation/habitat were present, or if the significance of that vegetation/habitat differed, the area was divided and described as separate SNAs.

Data gathered during surveys were documented in property reports. These reports describe the location and ecological context of the property, and the vegetation and habitats present. Areas of significant indigenous vegetation and/or habitat were described and assessed separately (as SNAs) in the reports. These reports were provided to landowners as drafts and were not finalized until landowners' questions or concerns had been addressed. Once finalized, the SNAs were delineated on Council's electronic mapping system (GIS) and the reports became the property of the landowner and Council.

High altitude areas (above 900m altitude) were not covered by the SNA survey project due to limited resources and the fact that activities above that altitude are covered by other plan rules. Surveys of six large properties in the upper Rangitata valley were left till the end of the District-wide survey, to await the outcome of tenure review of pastoral leases in that area.

*Valley-floor sedgeland/rushland (wetland) and limestone bluff*

# 5. SIGNIFICANCE ASSESSMENTS

The Timaru District Plan assessment procedure for determining whether an area is significant in terms of section 6(c) of the Resource Management Act 1991 is defined in Method 7 (Part B2) of the plan. This procedure contains 'primary' and 'other' ecological criteria. It also assesses future ecological value (long term sustainability) of an area and lists final considerations that Council will have regard to before an area is confirmed as significant. The Timaru District Plan ecological criteria are:

Primary criteria:

- Representativeness
- Rarity
- Diversity and pattern
- Distinctiveness / special features.

Other criteria:

- Size / shape
- Connectivity
- Long term sustainability.

At commencement of the survey project, these ecological criteria and the way they would be interpreted and applied were described in a document: "Guidelines for the Application of the District Plan Criteria" (Harding, 2004). These guidelines were provided to the Rural 3 Zone Working Party for comment and were trialled on the first property surveys.

In the guidelines, attributes of each site (possible SNA) were assessed as High, Medium/High, Medium, Low/Medium or Low against each of the primary and other criteria. If a site scored High for any of the primary criteria, it was deemed significant. Otherwise, a combination of Medium/High and Medium scores for primary and other criteria were required for a site to meet the significance threshold. For example, High to Medium scores for size/shape and connectivity enabled otherwise marginal sites to meet the significance threshold. The sustainability criterion was not used to assess significance, as sustainability is not a measure of the existing value of a site (Denyer *et al*, 2005). The score for each criterion and the reasons for the scores are set out in each site (SNA) report.

During the period of the survey project, Environment Canterbury (Canterbury Regional Council) prepared a Regional Policy Statement which includes a policy (9.3.1) for the protection of significant natural areas. Appendix 3 of Policy 9.3.1 provides criteria for "determining significant indigenous vegetation and significant habitat of indigenous biodiversity". Guidelines for the application of these ecological criteria were prepared by Wildlands (2013).

The Regional Policy Statement ecological criteria and Wildland's guidelines include recent assessments of biodiversity loss, such as: the Land Environments framework (Leathwick *et al*, 2003); the status of indigenous vegetation in those Land Environments (Walker *et al*, 2006); the list of historically rare terrestrial ecosystems (Williams *et al*, 2007); and the national priorities for protection of biodiversity on private land (MfE and DOC, 2007).

These recent analyses and policies are compatible with the Timaru District Plan ecological assessment criteria and the guidelines prepared for the SNA survey project. They emphasise the importance of depleted habitats, notably those in lowland parts of Timaru District, and rare ecosystems, notably limestone, basalt, wetland, braided river, moraine and coastal ecosystems.

These depleted habitats and rare ecosystems are already captured by the existing District Plan criteria.

However, following adoption of the Regional Policy Statement, the presence of threatened land environments and historically rare ecosystems at a site was noted in SNA reports.

The rarity criterion of the Timaru District Plan ecological assessment criteria refers to the presence of species which are nationally rare or threatened. National rarity and threat are determined by groups of specialists using, most recently, the criteria proposed by Townsend *et al* (2008). Lists of 'threatened' and 'at risk' species are revised periodically, reflecting any change in characteristics of species' populations. Changes in threat status usually arise from increased knowledge of species' population sizes and distribution, and new threats to species and their habitats.

*Common skink (Hermann Frank photo)*

Changes in species' threat status during the period of the survey has affected significance assessments in Timaru District. In the first years of the survey project, kereru/NZ pigeon (*Hemiphaga novaeseelandiae*) was listed as 'gradual decline'. Kereru are no longer considered at risk or threatened (Robertson *et al*, 2012). Mid-way through the survey project, rifleman (*Acanthisitta chloris*) was listed as 'gradual decline'. Rifleman are no longer considered at risk or threatened (Robertson *et al*, 2012). For most of the survey period, common skink (*Oligosoma polychroma*) was not listed as at risk or threatened. In 2012, the clades (distinct forms) of common skink, as defined by (Liggins *et al*, 2008), were reassessed. Common skink clades 4 and 5 (the clades present in Timaru District) are now listed as at risk (declining) (Hitchmough *et al*, 2013).

The effect of these changes in species' threat status is that the significance of some habitats (e.g. kereru and rifleman) may have been over-valued in the early years of the project, and the significance of others (e.g. common skink) under-valued. This is an inevitable consequence of a survey programme that extends over several years. A reduction in species' distributions may also affect significance assessments over the duration of the survey. Two high-profile threatened species, blue duck and long-tailed bat, have both suffered substantial declines in numbers and range during the period of the survey.

*Tree nettle is uncommon in Timaru District*

A further attribute that may have affected assessment of rarity of sites over the term of the project is increased knowledge of locally-uncommon species. Little was known about which plant species (other than those already listed as at risk or threatened) were locally-uncommon in Timaru District. As the survey progressed, a greater understanding was gained till, now, at the end of the project, there is very good information about which plant species are locally-uncommon.

# 6. CONFIRMATION OF SNAs

The Timaru District Plan assessment procedure for determining whether an area is significant (Method 7; Part B2) requires that "before deciding whether or not any identified area should be confirmed as being significant, Council will have regard to the following matters:

a) existing land use and the degree of modification associated with the site;
b) economic effects on the landowner (e.g. management costs, lost development potential);
c) other options for ensuring the identified values and their needs are recognised and protected;
d) presence and level of animal pests and weeds;
e) resources required to implement effective protection;
f) whether or not identified values are under threat;
g) the extent to which values are or are not protected elsewhere;
h) any other relevant factor."

Some of these matters are discussed in the site (SNA) reports, such as the degree of modification (a), animal pests and weeds (d) and threat (f).

*Old-growth plains forest at Waihi Bush, protected by a QEII covenant*

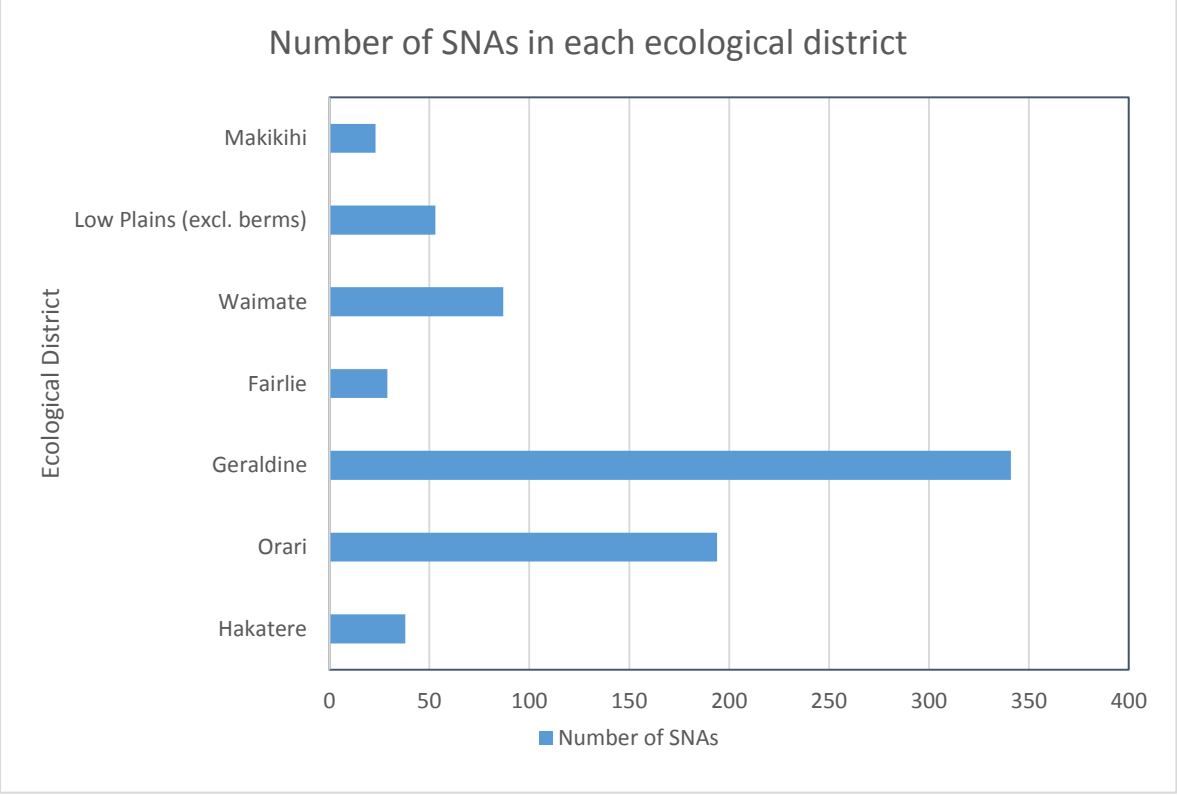
# 7. SIGNIFICANT NATURAL AREAS (SNAs)

## 7.1 Surveyed SNAs

At completion of the survey project in 2016, 772 SNAs covering a total area of 7260 hectares had been surveyed and mapped. A total of 204 properties were assessed during the survey, including small lifestyle blocks, roadsides, low country farms, large hill country farms and high country stations. Nearly all (95%) of the properties were assessed by field survey. Access was not permitted to ten properties. SNAs were assessed on those properties by desk-top analysis of available information (aerial photographs, roadside views and data from earlier surveys or similar sites), in consultation with the landowners.

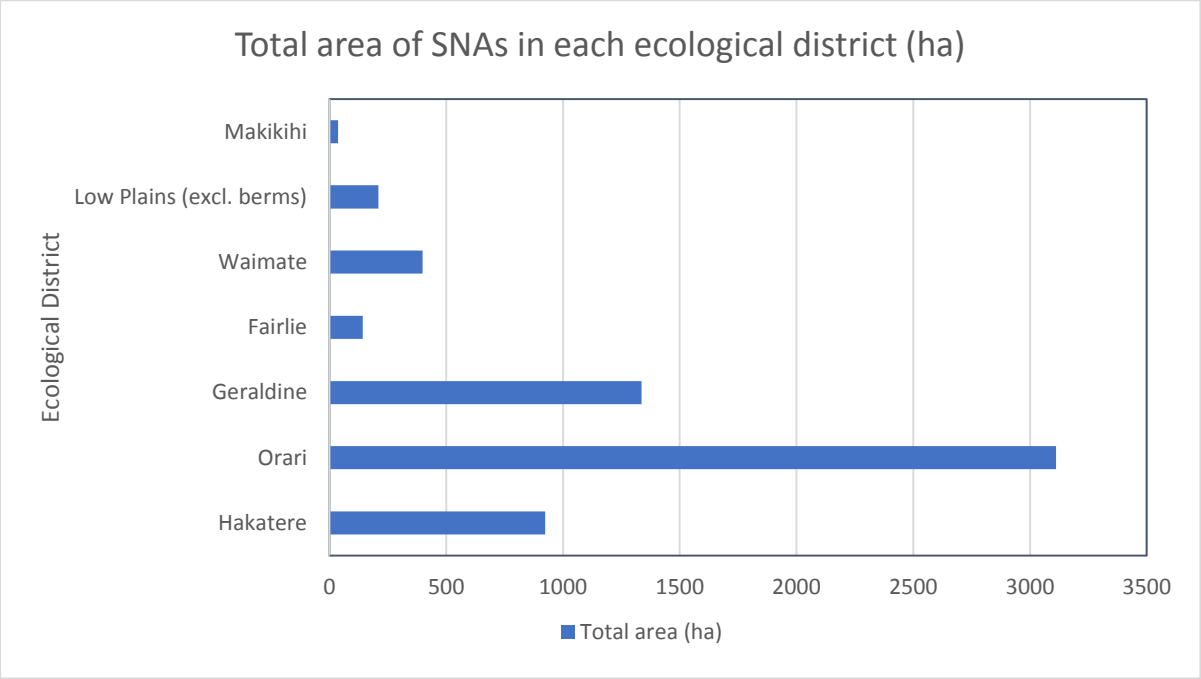
Surveyed SNAs are not spread evenly throughout Timaru District. Vegetation and habitat is more depleted and modified at lower-altitude and coastal areas than at higher-altitude inland areas. This uneven distribution of SNAs is illustrated by the number and extent of SNAs in each ecological district. Ecological districts with the largest number of SNAs are Geraldine (341 SNAs) and Orari (194). The numbers of SNAs in other ecological districts are: Waimate (87); Low Plains (60); Hakatere (38); Fairlie (29); and Makikihi (23).

Figure 1: Number of SNAs in each ecological district within Timaru District



The ecological district with the largest area of SNAs is Orari (3112 hectares), followed by Geraldine (1336ha) and Hakatere (924ha). The total areas of SNAs in other ecological districts are: Waimate (398ha); Plains (209ha); Fairlie (142ha); and Makikihi (37ha). The largest single SNA in each ecological district is: Orari (178ha); Geraldine (106ha); Hakatere (109ha); Waimate (89ha); Low Plains (11ha); Fairlie (15ha); and Makikihi (5ha).

Figure 2: Total area of SNAs in each ecological district within Timaru District

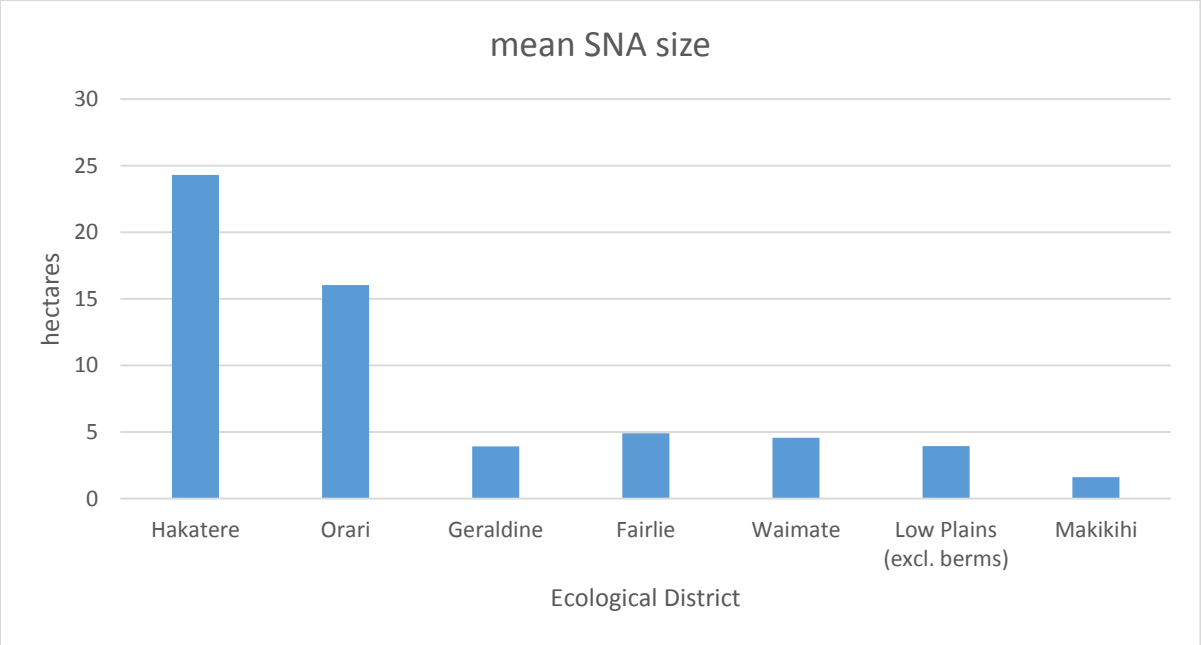



These totals exclude areas of exotic river-berm forest along the Orari and Rangitata rivers in the Low Plains ED, and the braided beds of Rangitata River and Forest Creek in Hakatere ED. Those areas have been assessed and mapped as SNAs for their habitat values.

*Braided bed of the upper Rangitata River*

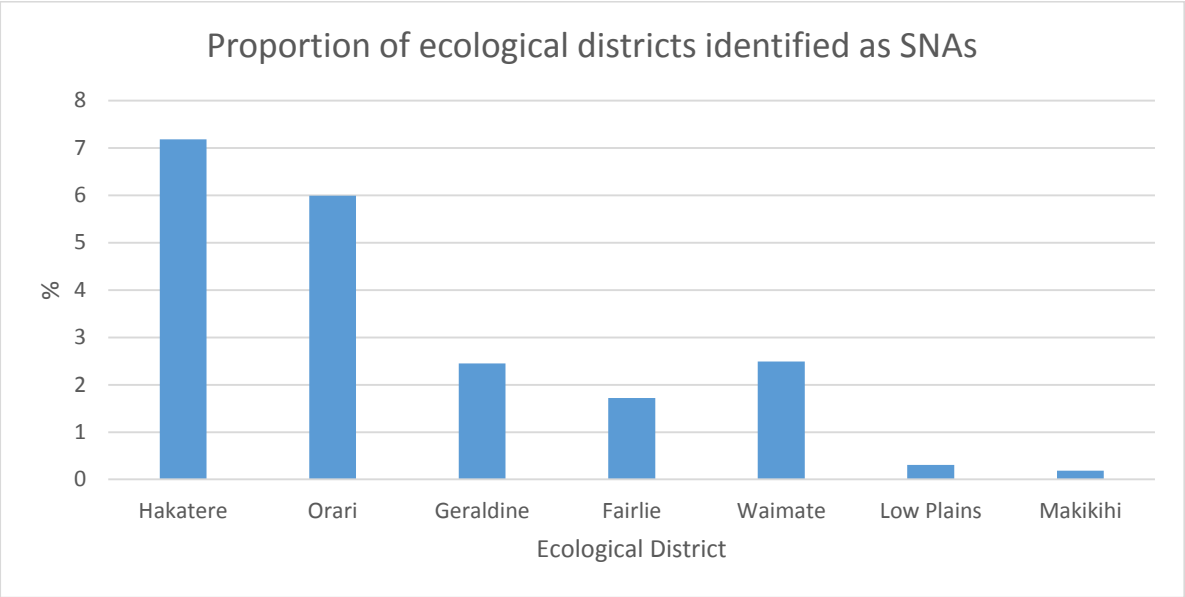
The ecological districts with the largest mean size of SNAs are Hakatere (24.32ha) and Orari (15.17ha). The mean areas of SNAs in other ecological districts are: Geraldine (3.92ha); Waimate (4.57ha); Low Plains (3.94ha); Fairlie (4.9ha); and Makikihi (1.61ha).

Figure 3: Mean size of SNAs in ecological districts within Timaru District




The ecological districts with the largest proportion (within Timaru District) identified as SNAs are Hakatere (7.18ha) and Orari (5.23%). The proportions of other ecological districts identified as SNAs are: Geraldine (2.44%); Waimate (2.49%); Low Plains (0.31%); Fairlie (1.72%); and Makikihi (0.19%).

Figure 4: Proportion of ecological districts identified as SNAs



## 7.2 Other SNAs

The District-wide SNA survey described in this report was primarily a survey of indigenous vegetation at terrestrial habitats. The resources available for this survey were not sufficient to provide for specialist fauna surveys, such as for lizards or invertebrates. Fauna observed during surveys (notably indigenous birds) and obvious habitats (notably lizard habitat) were recorded and influenced SNA selection. However, most fauna habitat outside areas of indigenous vegetation, such as stone piles (lizard habitat) and areas of aquatic habitat were not deliberately surveyed.

All areas of indigenous vegetation (especially woody vegetation) at lower altitudes in Timaru District that appeared to have potential to be significant were covered by the SNA survey, except protected areas administered by the Department of Conservation and Timaru District Council, and some QEII covenants.

Some small areas of young (regenerating) or degraded low-altitude indigenous vegetation were not covered by the survey. It is most unlikely that those areas are significant when assessed against the District Plan criteria. Good examples are young matagouri (*Discaria toumatou*) shrubland/scrub and silver tussock (*Poa cita*) grassland on low-altitude hill slopes, both of which are communities that are often induced by farm management, notably fertiliser application.

Conversely, relatively large areas of planted forest dominated by exotic trees on the berms of the Orari and Rangitata rivers were assessed as part of the SNA survey. This vegetation supports a number of indigenous plant species, including remnant kowhai, lowland ribbonwood and totara trees, regenerating kanuka and cabbage tree, and numerous indigenous ferns and shrubs. It provides a large area of continuous habitat for black shag (*Phalacrocorax carbo*), fantail (*Rhipidura fuliginosa*), grey warbler (*Gerygone igata*) and white-faced heron (*Ardea novaehollandiae*). Adjacent open river berm sites provide habitat for native riverbed plant communities, lizards and riverbed birds.

Other vegetation and habitats that are likely to be significant and deserve recognition in the District Plan are:

- areas above 900m altitude
- areas of river berm (other than those already surveyed along Rangitata and Orari rivers)
- open water at rivers, lakes, ponds, estuaries
- water races
- rocky sites and shublands (lizard habitat)

While this District-wide survey has identified existing SNAs, it is important to recognise that assessments of significance change over time. The threat status of individual species changes as species' populations and threats change. Assessments of depletion and rarity of vegetation and habitats also change over time, as illustrated by analysis of the Land Environments framework (e.g. Walker *et al*, 2006). It is likely that further information about species' distribution and threats, and the depletion/rarity of vegetation and habitats will mean that other areas will, over time, become significant. Periodic review of SNAs may be appropriate.

# 8. ECOLOGICAL VALUES OF SNAs

## 8.1 Vegetation

Most SNAs identified during this survey support indigenous woody vegetation. This is because a vast proportion of Timaru District originally supported forest, so remnant or regenerating indigenous woody vegetation has higher representativeness values. It is also because other indigenous plant communities, such as wetland, grassland and treeland, are substantially depleted. Most woody vegetation within SNAs is either younger (regenerating) forest and is modified by plant and animal pests and/or grazing. There are some areas of remnant (original) indigenous forest outside of public conservation land, such as Waihi Bush near Woodbury, Arowhenua Bush near Temuka and several areas in foothills valleys.

Most other areas of indigenous vegetation at lower altitudes in Timaru District are to some extent modified. SNAs have been selected primarily because they are the few remaining examples of indigenous vegetation or they provide habitat for 'at risk' or 'threatened' species (i.e. rarity values). All lowland SNAs are in Land Environments within which indigenous vegetation is acutely or critically threatened. A substantial proportion of lowland SNAs in Timaru District are areas of exposed limestone or basalt (bluffs and boulderfields). These areas have escaped deliberate clearance as they are too steep and rocky to cultivate or plant. However, many of these sites are substantially modified by plant pests, especially low-growing species such as Chewings fescue (*Festuca rubra*), mouse-ear hawkweed (*Pilosella officinarum*) and stonecrop (*Sedum acre*).

Other vegetation represented in lowland SNAs is sedgeland/rushland (wetlands), shrubland and grassland. These SNAs are small and many are modified. However, they represent all that is left of indigenous vegetation or habitat in this depleted part of Timaru District.

## 8.2 Flora

More than 320 indigenous vascular plant species were recorded during the SNA survey. The most common species recorded were pohuehue (*Muehlenbeckia australis*) at 79% of SNAs, cabbage tree (78%), *Coprosma propinqua* (77%), broadleaf (75%) and mahoe (73%). Other common species, recorded at more than 50% of SNAs, were mapou, kohuhu, fuchsia, kowhai, native jasmine (*Parsonsia heterophylla*), prickly shield fern (*Polystichum vestitum*), lancewood, bush lawyer (*Rubus cissoides*), five-finger, necklace fern (*Asplenium flabellifolium*), *Coprosma crassifolia*, hound's tongue fern (*Microsorum pustulatum*), totara, native bindweed (*Calystegia tuguriorum*) and wineberry.

Seven 'threatened' plant species, as listed by de Lange *et al* (2012), were recorded:

- *Anemanthele lessoniana* (gossamer grass); nationally vulnerable (1 site)
- *Carmichaelia crassicaulis* (coral broom); nationally vulnerable (2)
- *Carmichaelia kirkii* (scrambling broom); nationally vulnerable (6)
- *Carmichaelia torulosa* (Canterbury pink broom); nationally endangered (10)
- *Gentianella calcis* (limestone gentian); nationally critical (3)
- *Olearia fimbriata* (tree daisy); nationally vulnerable (1)
- *Rytidosperma merum*; nationally vulnerable (2)

Gossamer grass (*Anemanthele lessoniana*) is widely cultivated and was observed at a number of sites. However, only one naturally-occurring population was recorded, on steep rocky slopes in an SNA on the Brothers Range. Coral broom (*Carmichaelia crassicaulis*) was observed at two sites in tussockland in Orari Ecological District. It is likely to be present at other foothills locations. The limestone gentian (*Gentianella calcis*) is the most threatened plant in Timaru District.

It is extremely rare, endemic to South Canterbury and critically threatened by habitat loss and grazing. The tree daisy, *Olearia fimbriata*, was recorded at only one location, in Orari Ecological District. The closest known populations are on Banks Peninsula and in the Tasman Valley. The danthonia grass, *Rytidosperma merum*, is commonly overlooked and may be present at other plains sites.

*Limestone gentian (Gentianella calcis)*

Eighteen 'at risk' plant species, as listed by de Lange *et al* (2012), were recorded:

- *Aciphylla subflabellata*; declining (4 sites)
- *Brachyglottis sciadophila* (climbing groundsel); declining (9)
- *Coprosma acerosa*; declining (4)
- *Coprosma virescens*; declining (17)
- *Einadia allanii*; naturally uncommon (29)
- *Eryngium vesiculosum* (sea holly); declining (1)
- *Geranium microphyllum*; naturally uncommon (22)
- *Gingidia enysii*; naturally uncommon (12)
- *Hebe amplexicaulis*; naturally uncommon (2)
- *Korthalsella clavata* (dwarf mistletoe); naturally uncommon (1)
- *Muehlenbeckia ephedroides*; declining (9)
- *Olearia lineata*; declining (3)
- *Pleurosorus rutifolius* (blanket fern); naturally uncommon (1)
- *Pseudopanax ferox* (fierce lancewood); naturally uncommon (11)
- *Raoulia monroi*; declining (1)
- *Teucridium parvifolium*; declining (10)
- *Tupeia antarctica* (white mistletoe); declining (5)
- *Urtica linearifolia* (swamp nettle); declining (1)

*Sea holly (Eryngium vesiculosum)*

*Hebe amplexicaulis* is a locally endemic species, confined to the South Canterbury foothills.

*White mistletoe (Tupeia antarctica)*

Other threatened or at risk plant species known to be present in South Canterbury but not recorded during this SNA survey are *Coprosma pedicellata* (declining), *Leucogenes tarahaoa* (nationally vulnerable) and *Luzula celata* (declining). *Coprosma pedicellata* is known from protected lowland forest near Peel Forest; *Leucogenes tarahaoa* is a South Canterbury endemic confined to the upper slopes of the Tara Haoa (Mt Peel) Range; and *Luzula celata* is present on riverbeds in the upper Rangitata valley.

A substantial number of plant species (40), other than those listed above, were recorded at five or less sites. Notable among these 'locally uncommon' species are:

- *Asplenium trichomanes* (maidenhair spleenwort); fern; dry rocky habitats (4 sites)
- *Blechnum colensoi*; fern; shaded stream-side habitats (2)
- *Blechnum membranaceum*; fern; lowland forest (3)
- *Cheilanthes distans* (woolly cloak fern); dry rocky habitats (1)
- *Coprosma ciliata*; shrub; lowland forest (1)
- *Coprosma petriei*; sub-shrub; lowland grassland (1)
- *Ctenopteris heterophylla*; fern; shaded stream-side habitats (5)
- *Cyathea colensoi* (mountain tree fern); foothills forest (5)
- *Cystopteris tasmanica* (bladder fern); rocky habitats (5)
- *Dianella nigra* (blue berry); lowland forest (2)
- *Dicksonia squarrosa* (rough tree fern); lowland forest (2)
- *Earina mucronata*; perching orchid; lowland swamp forest (1)
- *Helichrysum intermedium*; shrub; lowland forest (3)
- *Hymenophyllum bivalve*; filmy fern; lowland forest (1)
- *Hymenophyllum demissum*; filmy fern; lowland forest (4)
- *Hymenophyllum minimum*; filmy fern; stream-side scrub (1)
- *Microlaena polynoda*; grass; basalt bluffs (3)
- *Olearia odorata* (tree daisy); small tree; lowland habitats (2)
- *Pellaea calidirupium*; fern; dry rocky habitats (2)
- *Raukaua simplex*; small tree; lowland forest (5)
- *Rubus australis*; climber (lawyer); lowland forest (4)
- *Scandia geniculata* (climbing aniseed); scrub habitats (2)
- *Sophora prostrata* (prostrate kowhai); dry rocky habitats (1)
- *Tmesipteris* species (chain fern); lowland forest (2)
- *Trichomanes venosum*; fern; lowland forest (1)

*Chain fern (Tmesipteris sp.)*

Notable among these species is *Blechnum membranaceum*, as these South Canterbury records represent a southern extension to the previously recorded distribution of the species.

Other interesting plant records are the discovery of a new small-leaved shrubby mahoe species (*Melicytus* "Waihi"), confined to forest margins on the floodplain of the Waihi River (Waihi Gorge to Woodbury). This species is closely affiliated with *Melicytus flexuosus* (a 'declining' species), though considered to be a new undescribed species (Brian Molloy, *pers.comm.*). Assessment of this taxa, if established to be a distinct species, using the NZ Threat Classification System Manual (Townsend *et al*, 2008), gives it a threat status of 'nationally critical'. It was recorded from 13 sites.

*Blechnum membranaceum*

Also notable is the limited occurrence of mountain beech (*Fuscospora cliffortioides*), recorded from only seven sites, and southern rata (*Metrosideros umbellata*), which was recorded from only six sites (though is also present at a number of locations within Peel Forest Park Scenic Reserve). Other noteworthy records are *Parietaria debilis*, a palatable understorey species of fertile sites (recorded from only nine sites), and tree nettle (*Urtica ferox*), recorded from only 11 sites.

*Melicytus "Waihi"*

## 8.3 Fauna

This District-wide SNA survey did not include targeted surveys of fauna, except for the survey of blue duck habitat at the commencement of the project. However, observations of bird and lizard species were recorded. Native bird species recorded during SNA surveys were:

- Australasian harrier (*Circus approximans*): common; open habitats
- bellbird (*Anthornis melanura*): common; forest and shrubland
- black-fronted tern (*Sterna albostriata*): local; riverbed and river-side pasture
- black shag (*Phalacrocorax carbo*): occasional; foothills valleys
- blue duck (*Hymenolaimus malacorhynchos*): rare; foothills streams
- brown creeper (*Mohoua novaeseelandiae*): common; foothills forest
- grey warbler (*Gerygone igata*): common; forest and shrubland
- fantail (*Rhipidura fuliginosa*): common; forest and shrubland
- karearea/eastern falcon (*Falco novaeseelandiae*): occasional; foothills open country
- kereru/NZ pigeon (*Hemiphaga novaeseelandiae*): common; forest
- paradise shelduck (*Tadorna variegata*): common; wetlands and pasture
- rifleman (*Acanthisitta chloris*): common; forest and shrubland
- silvereye (*Zosterops lateralis*); common; forest
- shining cuckoo (*Chrysococcyx lucidus*); common; forest
- black-backed gull (*Larus dominicanus*): occasional; open country
- pied oystercatcher (*Haematopus ostralegus*); occasional; riverbeds and pasture
- tomtit (*Petroica macrocephala*): common, though largely confined to foothills forests
- tui (*Prosthemadera novaeseelandiae*): occasional; lowland forest
- welcome swallow (*Hirundo tahitica*); common; stream-side forest and shrubland
- white-faced heron (*Ardea novaehollandiae*): occasional; open country
- white-heron (*Egretta alba*): rare; stream beds

Two of these species are classified as 'threatened': black-fronted tern (nationally endangered); blue duck (nationally vulnerable), and three as 'at risk': black shag (naturally uncommon), karearea (recovering) and pied oystercatcher (declining), by Robertson *et al* (2012).

No long-tailed bats were observed during the survey, though small populations are present in the Peel Forest, Geraldine Downs and Hanging Rock areas. South Canterbury populations of this threatened (nationally endangered) species are declining. Several SNAs were selected for the habitat they provide for long-tailed bat, including areas of old crack willow (*Salix fragilis*) trees. At a number of other sites the presence of potential bat roost sites in trees or limestone bluffs influenced their selection as SNAs.

Blue ducks were observed at foothills streams in the early years of the SNA survey, but appear to have since disappeared from those locations. Areas of favourable blue duck habitat along foothills streams (Orari Ecological District) are identified as SNAs.

Common skink and Southern Alps gecko (*Woodworthia* sp.5) were observed at a number of SNAs, and jewelled gecko (*Naultinus gemmeus*) observed adjacent to an SNA (on public conservation land). Elsewhere, areas of favourable lizard habitat (rocky ground with woody vegetation) were included in SNAs. Independent surveys of lizards at limestone habitats in South Canterbury by a local lizard specialist (Hermann Frank) recorded the presence of Southern Alps gecko, common skink and McCann's skink (*Oligosoma maccanni*) (Frank, 2011). Hermann Frank has also discovered healthy populations of jewelled gecko elsewhere, including shrubland sites that were not identified as SNAs, illustrating the limitations of single-visit vegetation-focussed assessments such as this SNA survey.

*Blue duck, upper Waihi River*

*Jewelled gecko (Hermann Frank photo)*

Invertebrate species were not surveyed, though notable observations were recorded. The assistance of a local fauna surveyor, Julie Brown, revealed the presence of a native velvet worm (*Peripatoides* sp.) at one site and undescribed species of native micro-snails at other sites. Native butterflies were recorded. Dedicated survey at one SNA (Oliver Dryland Reserve) revealed the presence of 25 native moth species (Bowie, 2015).

## 8.4 Other Ecological Values

Two other important ecological values identified at SNAs are buffering and linkages. Vegetation at many SNAs buffers waterways such as foothill streams from the effects of activities on adjoining land. Some of these streams are water-supply catchments for domestic and agricultural use. At some locations, vegetation at SNAs also buffers indigenous vegetation on adjacent protected lands, such as Peel Forest Park, Orari Gorge and Waihi Gorge scenic reserves.

Some SNAs include areas of indigenous vegetation that links habitats, such as regenerating woody vegetation (scrub or shrubland) between areas of taller or denser vegetation. This provides opportunities for less mobile species, or species that favour vegetation cover, to move between areas of favourable habitat. This is important for species such as lizards which are vulnerable to predation when crossing open ground.

# 9. THREATS TO SNAs

## 9.1 Plant Pests

Naturalized (exotic) plant species are present at all SNAs in South Canterbury. They are most common at disturbed lowland sites and least common at areas of montane (foothills) forest. Some ubiquitous species have little effect on ecosystem functioning, such as the herb, wall lettuce (*Mycelis muralis*), in stands of indigenous forest. Other naturalized species have a major effect, such as sycamore (*Acer pseudoplatanus*) in indigenous forest and Chewings fescue (*Festuca rubra*) on limestone scarps.

Naturalized plant species commonly present in taller woody indigenous vegetation in Timaru District are male fern (*Dryopteris filix-mas*), Himalayan honeysuckle (*Leycesteria formosa*) and a number of grasses and herbs, including wall lettuce. Other species less commonly present are old man's beard (*Clematis vitalba*), sycamore, ash (*Fraxinus excelsa*), rowan (*Sorbus aucuparia*), hawthorn (*Crataegus monogyna*), barberry (*Berberis glaucocarpa*), Darwin's barberry (*Berberis darwinii*), Khasia berry (*Cotoneaster simonsii*), spindle tree (*Euonymus europaeus*), flowering currant (*Ribes sanguineum*), gooseberry (*Ribes uva-crispa*), Chilean flame creeper (*Tropaeolum speciosum*), burdock (*Arctium minus*), hedge woundwort (*Stachys sylvatica*), stinking iris (*Iris foetidissima*) and ground ivy (*Glechoma hederacea*).

Common at forest margins and in shrubland are blackberry (*Rubus fruticosus* agg.), gorse (*Ulex europaeus*), broom (*Cytisus scoparius*), Scotch thistle (*Cirsium vulgare*), Californian thistle (*Cirsium arvense),* nodding thistle (*Carduus nutans*), hemlock (*Conium maculatum*), horehound (*Marrubium vulgare)* and foxglove (*Digitalis purpurea*).

*Sycamore*

Plant pest species present at open shrubland or tussockland sites are gorse, broom, sweet brier (*Rosa rubiginosa*), thistles, woolly mullein (*Verbascum thapsus*), foxglove and pasture grasses. Other species present at some locations are Darwin's barberry, Khasia berry, Spanish heath (*Erica lusitanica*) and wilding conifers.

Important plant pests at wetland sites are crack willow, grey willow (*Salix cinerea*), soft rush (*Juncus effusus*), jointed rush (*Juncus articulatus*), monkey musk (*Mimulus* sp.), Yorkshire fog (*Holcus lanatus*), gorse and blackberry. Naturalized plant species which pose a significant threat at open rockland sites are Chewings fescue, cocksfoot (*Dactylis glomerata*), mouse-ear hawkweed (*Pilosella officinarum*) and stonecrop (*Sedum acre*). Open riverbeds are threatened by broom, gorse, crack willow, grey willow, tree lupin (*Lupinus arboreus*), Russell lupin (*Lupinus polyphyllus*), false tamarisk (*Myricaria germanica*) and a number of exotic grasses and herbs.

At some locations native species from other parts of the country have become naturalized in Timaru District through local plantings. Good examples are lacebark (*Hoheria sexstylosa*) on the Geraldine Downs and gossamer grass (*Anemanthele lessoniana*) near residential gardens. The native climber, pohuehue (*Muehlenbeckia australis*), is abundant and weedy at lowland forest remnants, often smothering and eventually collapsing isolated trees.

## 9.2 Animal Pests

All SNAs in Timaru District are affected to some extent by naturalized (exotic) animals. Ubiquitous species, such as feral cats, possums, hedgehogs, stoats, rats and mice are likely to be present at most SNAs. Smaller animal pest species were not surveyed, though were noted when observed.

*Feral pig damage (rooting) in foothills forest*

Animal pests commonly present in foothills forest and shrubland are feral pigs and red deer. Feral goats are present at some locations. Wallabies are common in southern parts of Timaru District and were observed as far north as Peel Forest. Feral pigs and wallabies pose the greatest threat to SNAs in Timaru District. When present in high numbers, these animals almost completely destroy forest-floor vegetation, exposing soils to erosion and preventing regeneration of canopy species. Red deer and feral goats can also pose a significant threat, though are generally present in lower numbers in Timaru District.

Chamois and Himalayan tahr are present, mostly at higher altitudes, outside the area covered by this SNA survey. Hares, rabbits and ferrets are present at open sites throughout Timaru District. Feral pigeons are common at limestone scarps at lowland parts of Timaru District.

## 9.3 Other Threats

Grazing:

Grazing of SNAs by cattle, red deer and sheep occurs throughout Timaru District. Although many SNAs are fenced from grazing, a significant proportion are not. Cattle pose the greatest threat to forested SNAs, by browsing palatable plants, breaking understorey vegetation and pugging ground. Red deer are having a significant effect at some foothills forests, especially where subdivision fencing has enabled intensive stocking. At these sites deer almost completely remove understorey vegetation and destroy forest floor vegetation along well-formed tracks. Sheep pose less of a threat to forest, though do deplete understorey vegetation, especially at lowland forest remnants.

*Foothills forest grazed by deer (left) and un-grazed forest (right), on either side of boundary fence.*

Shrubland and scrub at foothills sites are affected by grazing only at sites where stock are grazed intensively. At most foothills sites indigenous woody vegetation is regenerating, especially in steeper valleys and on damper (south-facing) slopes. At these locations the effects of grazing effects are localised, notably at seepages (wetlands) or at stock camps.

Rockland (limestone and basalt bluff) sites at lowland parts of Timaru District are affected by grazing. Sheep graze palatable native grasses, herbs and shrubs, though do reduce competition from naturalized grasses at some sites. Cattle and deer graze palatable plants and destroy shallow limestone soils. These soils, which support the District's most critically threatened plant species, are trampled by cattle and heavily tracked by deer. Goats also deplete vegetation at these sites, though domestic goats are uncommon in Timaru District.

Wetlands are vulnerable to cattle. These heavy-hooved animals graze wetland plants, pug the soft wetland soils and defecate in water. Most large lowland wetlands in Timaru District are fenced from grazing. Wetlands most affected by grazing animals are modified rushland at lowland valley floors and seepages in foothills valleys.

*Unfenced wetlands are vulnerable to damage by cattle (especially pugging)*

Grazing effects on the few remaining lowland grassland sites that support SNAs are less clear and likely depend on the type, timing and intensity of grazing. Early results from grazing trials at Council's Oliver Dryland Reserve indicate that sheep grazing provides no significant benefit for survival of indigenous plant species in remnant grassland communities.

*Vegetation clearance on Geraldine Downs*

<u>Clearance</u>:

Most SNAs in Timaru District exist either because they have been deliberately protected by landowners or because they occupy sites that are too difficult to clear or keep cleared. Some clearance of woody vegetation has occurred during the term of the survey, notably during construction of farm tracks. Some clearance for track construction occurred in ignorance of plan rules; one appeared to be deliberate clearance just prior to survey of the property for SNAs.

The greatest land use change in Timaru District in recent years has been conversion of dry-stock or cropping farms and river flood channels to irrigated pasture for dairying. Conversion of river flood channels, notably the South Branch Rangitata River, has caused the loss of indigenous riverbed plant communities and habitat for common skink (including exotic scrub). Pasture improvement at some foothills locations has removed areas of tussockland and shrubland. At some locations this shrubland provided habitat for jewelled gecko (Hermann Frank, *pers.comm.*).

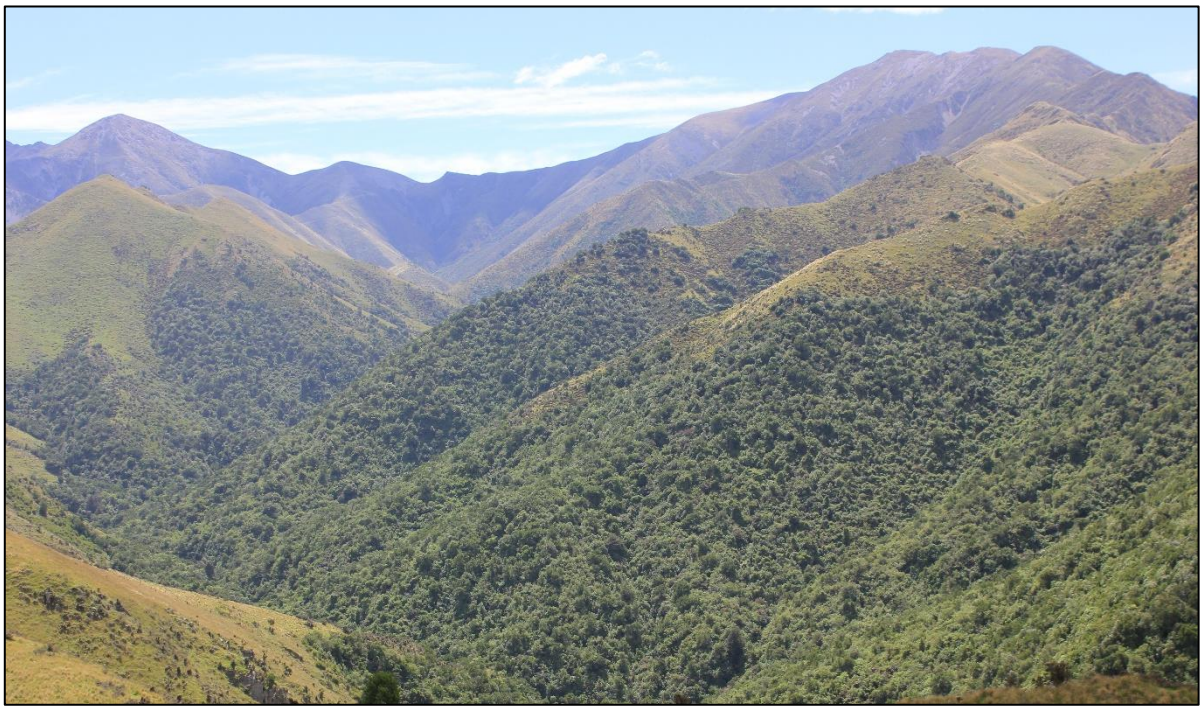
# 10. MANAGEMENT OF SNAs

A significant proportion of SNAs identified during this district-wide survey are managed in some way by the landowners. Some are fenced and de-stocked. Most are subject to regular possum control, especially in recent years while there have been good returns for possum fur. Most are hunted for larger animals (deer, pigs and wallabies), though few are hunted to the extent required to adequately protect indigenous vegetation from browsing. Recent availability of poison bait has prompted control of wallabies at some sites.

Plant pest control at most SNAs is limited to spraying woody weeds (especially broom and gorse) at SNA boundaries to prevent spread onto adjacent farmland. Very few SNAs receive regular and sustained plant pest control. Planting for revegetation has been undertaken at some sites, though most are not SNAs.

Timaru District Council's Natural Heritage Fund has provided money for fencing and plant pest control, though most years the Fund has been under-subscribed. In 2011 Council utilized the Fund to employ contractors to remove the most invasive plant pests (old man's beard, barberry, ash, hawthorn and sycamore) from high-value SNAs at inland parts of Geraldine Ecological District (Woodbury, Orari Gorge and Peel Forest). Contributions from the Fund have supported the Rangitata Landcare Group in their plant pest control efforts on the bed of the upper Rangitata River.

Property reports provided to landowners contain recommendations for management of SNAs. These recommendations are limited by the fact that they are based on a single site visit. Sometimes recommendations benefit from information about site and management history provided by landowners. The question most frequently asked by landowners is what they should be doing to manage SNAs on their properties.



*There are relatively extensive areas of regenerating indigenous forest in some foothills valleys.*

# 11. PROTECTION OF SNAs

## 11.1 District Plan Provisions

The most obvious method for protecting SNAs is provision in a district plan, such as the clearance rule in the operative Timaru District Plan (see Section 2). The advantage of this method is that it clearly defines that consent is required to clear significant indigenous vegetation or habitat. A disadvantage is that the existing (interim) definitions of significant indigenous vegetation and habitat in the Plan are not easily interpreted by people unable to readily identify indigenous plants and habitats of indigenous fauna. Furthermore, the existence of a clearance rule is not widely known, so clearance can easily occur in ignorance of the rule.

Clarification of what is significant indigenous vegetation has been provided by the District-wide survey. Now SNAs are clearly defined throughout Timaru District, with information about those SNAs held by landowners and by Council. SNAs are delineated on Council's digital mapping system (GIS) and the presence of an SNA is identified in any Land Information Memorandum (LIM) for the property. Inclusion of SNAs in the reviewed Timaru District Plan, on the District Plan maps and schedules, will allow anyone to view the extent and location of SNAs in Timaru District.

However, this method will still have limitations. Changes to what is considered significant, changes in threat status of species, and improved understanding of habitats of indigenous fauna will occur over time. Some areas not considered to be significant at present, may be considered significant in the future. For this reason any rule restricting clearance of SNAs should also apply to any as yet unrecognized areas of vegetation or habitat which meet the criteria for SNAs.

There is a further limitation to protection of SNAs through District Plan provisions. The effectiveness of plan rules relies on compliance by landowners and monitoring by Council. Most landowners who have had SNAs surveyed on their properties seem genuinely committed to protection of those sites. However, ownership of properties changes and landowner attitudes may change, especially in response to changing land uses and farming practices. If landowners clear vegetation or habitat at SNAs, either deliberately or through ignorance of plan rules, protection of SNAs is then dependent on effective enforcement by Council.

Another challenge to protection by this method is the ability to identify the likely threats to SNAs. Deliberate clearance is the most obvious threat, but other actions (or lack of action) may lead to the loss of the values for which SNAs were selected. A good example is the change from extensive sheep and cattle farming to intensive deer farming on hill country properties. This land use change has led to depletion of understorey and forest floor vegetation in indigenous forest and will likely result in the eventual collapse of that forest. Another example is the spread of wallabies at southern parts of Timaru District. If uncontrolled, wallabies can destroy forest understorey vegetation, reducing ecological values and threatening the long term survival of the forest.

District plan rules will only offer effective protection if the rules are clear and comprehensive, are well known and understood, and if there is a commitment to ensuring compliance with the rules.

### 11.2 Other Methods for Protection

The most effective way to ensure the protection of SNAs is for landowners to be committed to protection of SNAs on their own properties. As the District-wide survey progressed it became very obvious that the most important outcome of the survey was not just that Council would have good information about SNAs, but that landowners would also have good information. Most landowners are interested in the value of the vegetation or habitat on their properties, intrigued to learn that it is regarded as important for the District, and proud if there are threatened or notable species present. This landowner interest in SNAs provides great opportunities for protection and enhancement of SNAs. If landowner interest in SNAs can evolve to a commitment to protection, then District Plan rules become a backstop for protection, rather than the primary method of protection.

The challenge for Council is to encourage landowners to manage and protect SNAs on their properties. Obvious ways in which Council can assist are advice and financial support for management activities and protection initiatives. The ideal outcome is for landowners themselves to provide secure and enduring protection for SNAs, such as through protective covenants (e.g. QEII Trust open space covenants).

## 12. PRIORITIES FOR MANAGEMENT AND PROTECTION

Survey of SNAs included assessment of the value of the SNA against each of the ecological assessment criteria. These attributes were ranked from High to Low, as outlined in Section 5. The purpose of that assessment is to make clear the attributes for which the SNA is significant. A secondary purpose is to allow comparison of the relative values of SNAs.

Selecting priorities for management and protection of SNAs depends on the objectives of that management or protection. For example, if the objective is to protect populations of threatened species, the value of the SNA as assessed against the Rarity criterion would be most relevant. Or, if the objective is to protect the best examples of the original vegetation of Timaru District, the Representativeness criterion would be the most relevant. To determine general priorities for management and protection, a combination of the values of the SNA for each of the four primary and two other criteria is appropriate.

Management and protection of all SNAs are important. However, SNAs that are highest priority for immediate protection are those that are most threatened. Priority plant communities/terrestrial ecosystems for management and protection (based on existing threats) are listed below in order of priority (high to low).

- grassland/shrubland on the plains (Low Plains and High Plains EDs)
- forest remnants on the low plains (Low Plains ED)
- grassland/herbfield on inland river terraces (Hakatere ED)
- herbfield/rockland plant communities on limestone bluffs (Geraldine ED)
- valley floor sedgeland/rushland (wetlands) (Hakatere, Orari and Geraldine EDs)
- forest on river/stream terraces (Geraldine and Orari EDs)
- shrubland/regenerating forest on dry hill slopes (Geraldine, Fairlie and Waimate EDs)
- sedgeland/rushland/herbfield at coastal estuaries and lagoons (Low Plains and Makikihi EDs)
- hill country forest (Orari ED)

# 13. CONCLUSION

This SNA survey represents an assessment of areas of significant indigenous vegetation and habitat throughout Timaru District. These SNAs define the natural character of Timaru District. They contain remnants of the vegetation that was previously widespread, and they provide habitat for a number of threatened and at risk plant and animal species.

This SNA survey has achieved two important goals. It has clearly identified significant areas for which Council is obliged to provide protection. And, it has provided up to date information to landowners about significant vegetation and habitat on their properties. Consequently, and importantly, it has raised awareness about the District-wide value of these SNAs.

Many SNAs identified through this survey are threatened by plant and animal pests. Some are threatened by grazing and clearance. Many are small, isolated, poorly buffered and modified. Management and protection of SNAs is urgent.

The best long-term mechanism for protection of SNAs is to encourage and support landowners to maintain and enhance the ecological values of SNAs on their properties. The other necessary mechanism is protection of SNAs from clearance by District Plan rules. Achieving protection of SNAs will require an ongoing commitment from Council for advocacy and support to landowners, and monitoring of compliance with District Plan rules.

*Herbfield at Oliver Dryland Reserve: Raoulia monroi and Muehlenbeckia axillaris*

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# ACKNOWLEDGEMENTS

Many people have provided valuable support and assistance during the eleven-year period of this project. Most important have been: landowners for providing access to and information about their properties; District Council planning staff (Mark Geddes, Andrew Hammond, Phil Doole, Peter Kloosterman, Chris English and Peter Thomson) for administering and supporting the project; District Council GIS staff (Richard Lovell and Steve Caswell); Timaru District Councillors, notably Pat Mulvey who has remained involved since the start of the project; representatives of the Rural 3 Working Party stakeholder groups; botanists (Nick Head, Peter Heenan, Ines Schönberger and Kerry Ford) for assistance with identification of cryptic plant species; local specialists (Fraser Ross, Hermann Frank and Ines Stager) who provided useful information about likely SNAs; and those who assisted in some way with property surveys (Markus Davis, Alice Shanks and Julie Brown). I thank these people for their support and assistance.