Toitu te Land whenua Information New Zealand

Crown Pastoral Land Tenure Review

Lease name : ARGYLE STATION

Lease number : PS 055

Conservation Resources Report - Part 2

As part of the process of Tenure Review, advice on significant inherent values within the pastoral lease is provided by Department of Conservation officials in the form of a Conservation Resources Report. This report is the result of outdoor survey and inspection. It is a key piece of information for the development of a preliminary consultation document.

Note: Plans which form part of the Conservation Resources Report are published separately.

These documents are all released under the Official information Act 1982.

November 05

PART V

ATTACHMENTS

1 Appendices

a Dickinson, KJM, 1988. Umbrella Ecological District. Survey report for the Protected Natural Areas Programme. Department of Conservation, Wellington. Extract pp 68-85 and 107-109.

b Submission from M A Rodway, manager of Southland Fish and Game Council dated 12 July 1995.

2 Photos of Areas of Conservation Interest on Argyle Pastoral Lease

3 Illustrative Maps

Map 1 Cadastral Map

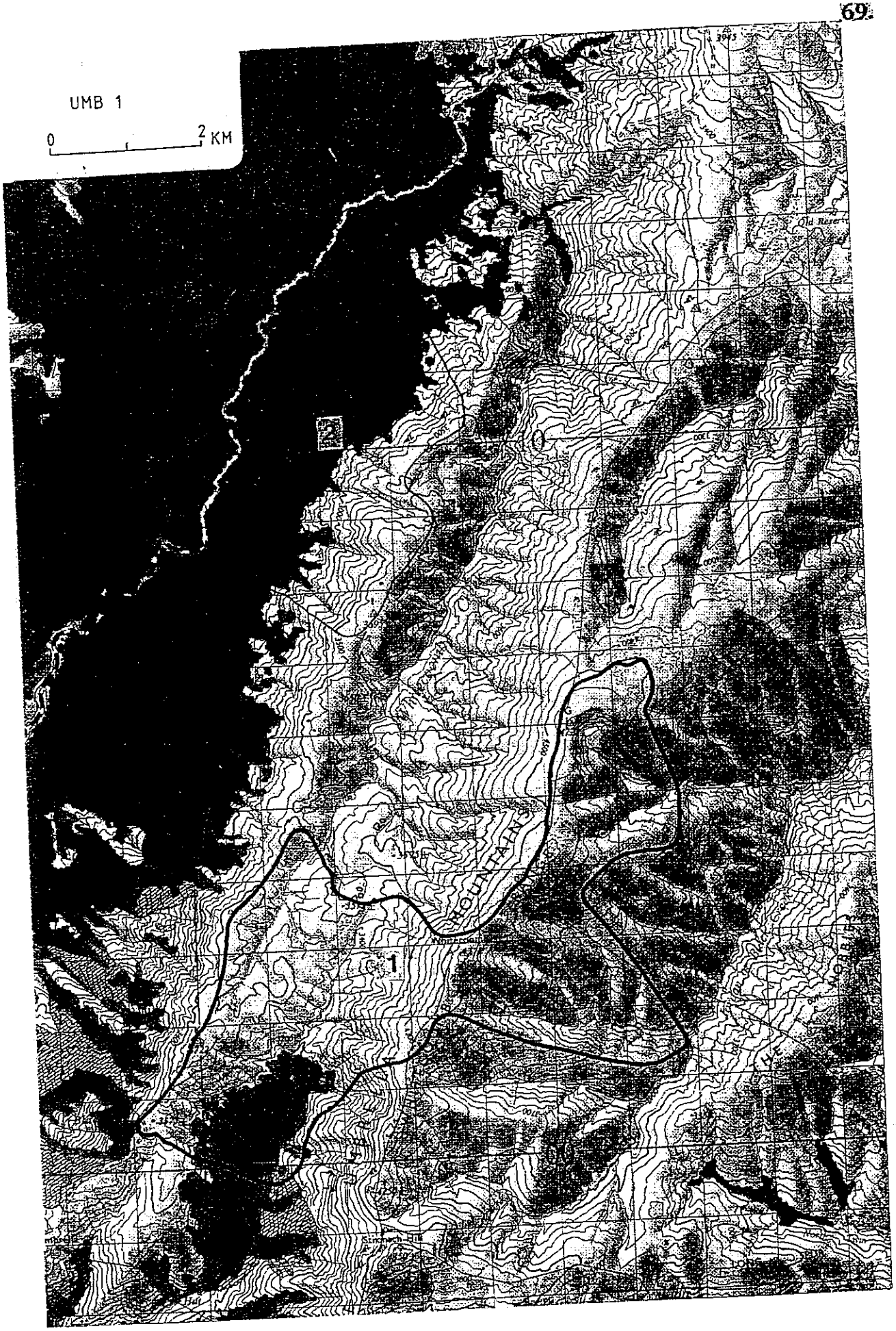
Map 2 Topographic map - conservation values

Map 3 Topographic map - recommendations

5.2. DESCRIPTIONS OF RECOMMENDED AREAS FOR PROTECTION

UMB 01 — Whitecoomb-Gem Lake - Argyle Burn — S152 937 029, SN 5380 C/26, SN 5693 D/1

Rich beech forest Silver beech forest	on colluvial slopes on gorge channel margins
Shrub-tussockland	on colluvial crest on colluvial gully slope
Modified shrub-tussockland	on colluvial gully slope (forest margins)
Tussock-shrubland	on colluvial slope (S. aspects) on gully slope on ridge
Tussockland	on cirque lip on cirque wall on ridge on colluvial slope on interfluve on gully slopes (N. aspects)
Modified-tussockland	on cirque wall
Grassland (modified-tussockland)	on moraine (terminal)
Shrubland	on ripply colluvial slopes (S. aspects)
Herb-tussockland	on colluvial slope on slumped colluvial slope
Tussock-herbfield	on slumped colluvial slope on ridge
Grass-herbfield	on colluvial crest on derivative slope
Sedge-herbfield	on ridge crest
Cushionfield	on raised area within flush on ridge on valley floor
Snowbank	in nivation hollow on cirque wall
Cushion-mossfield	on valley floor
Lichen-shrub-cushionfield Shrub-cushionfield Moss-shrubland	on valley floor
Moss-cushionfield	in flush (valley floor)
Sedge-mossfield	on creek margins in flush



Herbfield	Gem Lake outlet
Herb-cushionfield	in flush
Shrub-sedgeland	in flush
Shrub-mossfield	in flush
Cushion-mossfield	on valley floor
Herb-mossfield	in flush
Rock bluffs	on cirque wall
Rock bluffs	on ridge as summit tors

Vegetation and flora

The beech remnant contained within the valley of the Argyle Burn includes forest communities classified into Group 3 (rich beech forest) and Group 4 (silver beech forest). The stand is dominated in parts by red beech (*Nothofagus fusca*) and in others by silver beech (*N. menziesii*): mountain beech (*N. solandri* var. *cliffortioides*) is occasional. Red beech appears to be most abundant in the mid-reaches of the stand, particularly on the western bank of the Argyle Burn, whereas silver beech dominates in the northern higher altitude portions. The red beech dominated forest has an average canopy height of 22 m with an open understorey, individual species generally contributing <1% cover. These include the small trees broadleaf (*Griselinia littoralis*), marbleleaf (*Carpodetus serratus*) and *Pseudopanax simplex*, the shrubs *Coprosma colensoi*, *C. cuneata*, *C. parviflora*, *C. pseudocuneata*, *C. rhamnoides*, the climber, bush lawyer (*Rubus cissoides*), plus the herbs *Lagenifera strangulata*, *Epilobium pedunculare*, *Nertera ciliata*, a hooked sedge *Uncinia clavata* and fern *Grammitis billardierei*. In places, the filmy fern *Hymenophyllum multifidum* assumes dominance as ground cover.

The silver beech dominated forest averages 15 to 20 m in height with a canopy cover of 50-75%. Silver beech is also a prominent understorey component together with celery pine (*Phyllocladus asplenifolius* var. *alpinus*), snow totara (*Podocarpus nivalis*) and *Coprosma cuneata*, all of which achieve 5-25% cover in some areas. Other species include the shrubs *Coprosma ciliata*, *C. colensoi*, *C. propinqua* and *Brachyglottis buchananii*, plus the herbs *Blechnum fluviatile*, *B. minus*, *Grammitis billardierei*, *Forstera tenella* and *Luzuriaga parviflora* plus the orchids *Chiloglottis cornuta* and *Aporostylis bifolia*. Bryophyte cover generally ranges from 1 to 25%.

Sites classified into Groups 8 and 9 (mid- to high-altitude tussock grassland) are described as tussock-shrubland, shrub-tussockland and tussockland on the basis of their dominant species. The tussock-shrubland community is widespread on the margins and colluvial slopes immediately above and to the west of the Argyle Burn beech remnant. It also occurs in the Gem Lake catchment on the slopes of gullies and on southerly aspects. Dominant shrubs are mountain tauhini (*Cassinia vauvilliersii*), *Hebe* aff. *rakaiensis*

combination with narrow-leaved snow tussock (*Chionochloa rigida*), each generally in the cover categories 5-25%, or 25-50% and averaging *c.* 0.8 m in height. Dominant species in the tiers 0 to 0.4 are variously the subshrub *Brachyglottis revolutus*, the herbs and grass browntop (*Agrostis capillaris*), sweet vernal (*Anthoxanthum odoratum*), *Nertera dichondrifolia* and *Ranunculus lappaceus*. Other species present but with <1% cover are turpentine scrub (*Dracophyllum uniflorum*), *Coprosma cheesemanii* and *C. ciliata*, plus the herbs *Epilobium glabellum*, *Rytidosperma nigricans*, *Schizeilema haastii* var. *cyanopetalum*, *Anemone tenuicaulis*, *Festuca multinodis* and *Celmisia semicordata* var. *aurigans*.

The shrub-tussockland community occurs in the Whitecoomb East catchment on shady aspects and on the margins of the Argyle Burn. Narrow-leaved snow tussock dominates (5 to 50%) except where the community has been substantially modified and the tussocks replaced by prickly shield fern (*Polystichum vestitum*), sweet vernal and a bidibid (*Acaena caesiiglauca*).

The prominent shrub is generally *Hebe* aff. *rakaiensis*. The average canopy height in the least modified community is 0.8 m, but is only 0.3 m where the tussock cover has been depleted. Other abundant species include the subshrubs *Brachyglottis revolutus* and snowberry (*Gaultheria depressa*) plus the herbs *Celmisia prorepens* and *C. semicordata* var. *aurigans*. Species of infrequent occurrence include the subshrub *Pimelea pseudolyallii*, and the herbs *Epilobium tasmanicum*, *Hierochloë novae-zelandiae*, *Rytidosperma gracile*, a sedge *Carex berggrenii* and *Caltha obtusa*. Snow totara and celery pine feature on the margins of the Argyle Burn remnant beech stand.

Tussockland/modified tussockland is the most widespread community within this priority place for protection, occurring in the Gem Lake, Whitecoomb East and West catchments, as well as on White Umbrella ridge, from 900 to 1170 m. In some areas a large proportion of the tussock cover has been replaced by blue tussock (*Poa colensoi*) and/or browntop. However, floristic composition between sites of low and high degrees of modification remain substantially the same. The dominant tussock species in all cases is narrow-leaved snow tussock. Cover ranges from 5-25% in modified tussockland, to 50-75% and in certain localities 75-100% where modification appears low. In the latter cases litter cover is substantial, in places contributing 50% cover. Tussock height varies from 0.4 to 1 m, averaging *c.* 0.6 m overall. Species which dominate the ground tier include the subshrub snowberry and the herbs sweet vernal, browntop, catsear (*Hypochaeris radicata*), *Gunnera monoica* and *Celmisia gracilenta*. Other species include the herbs, *Raoulia subsericea*, *Erythranthera pumila*, *Epilobium chlorifolium*, *Hydrocotyle novae-zeelandiae* var. *montana*, *Helichrysum bellidioides*, *Rytidosperma nigricans*, *Oreostylidium subulatum* and the fern ally *Lycopodium fastigiatum*.

The community represented by Groups 10 and 11 is also widespread, occurring mainly in the eastern and western Whitecoomb catchments and the Gem Lake cirque. The community varies from shrubland through to herbfield when described on the basis of dominant species and occurs on a variety of aspects and topographical situations.

The shrubland and tussock-shrubland communities generally occur on southerly aspects at altitudes varying from 1150 to 1340 m. The dominant shrub species are turpentine scrub (*Dracophyllum uniflorum*) and/or *Hebe* aff. *rakaiensis*, with narrow-leaved snow tussock and

slim snow tussock (*Chionochloa macra*) subdominant. Shrub cover v ies from 5-25% to 75-100%, the latter being a generally species-poor community dominated by turpentine scrub. Average height varies from 0.2 to 0.8 m. Dominant species in the ground tier include the subshrub *Brachyglottis revolutus* (mainly 1-5% cover) and the herbs *Celmisia semicordata* var. *aurigans* (5-25%) and blue tussock which may achieve 50-75% cover. Other species occurring with <1% cover include the rare and regionally endemic shrub *Hebe poppelwellii*, the subshrub snowberry and the herbs *Aciphylla hectorii*, *Anisotome brevistylis* plus sedges *Uncinia fuscovaginata*, *Carex berggrenii* and *C. wakatipu*. The adventive component is consistently low.

The shrub-tussockland community within Groups 10 and 11 is particularly widespread in the Whitecoomb East catchment but also occurs in the western catchment and within the Gem Lake catchment. The community occupies a variety of aspects and topographic situations Dominated variously by narrow-leaved snow tussock, slim snow tussock or their hybrids, the shrubs *Hebe* aff. *rakaiensis* and turpentine scrub are the common subdominant canopy species. In places the regionally endemic and generally rare shrub *Pimelea poppelwellii* also achieves prominence. Tussock cover varies from 5-25% to 50-75% with height averaging *c.* 0.7 m if the 0.4-2 m tier is reached - a number of sites recorded maximum heights of <0.4 m. Dominant ground tier species included the subshrubs *Brachyglottis revolutus* and snowberry and the herbs blue tussock, *Celmisia prorepens* and *C. semicordata* var. *aurigans*. The subshrubs *Myrsine nummularia* and *Coprosma pumila*, sedge *Carpha alpina*, and comb sedge (*Oreobolus pectinatus*), together with the herbs *Caltha obtusa* and *Astelia nivicola* are locally abundant.

Other species occurring infrequently with <1% cover include the shrub *Hebe* sp. (?*subulata*), the cushion *Dracophyllum muscoides* plus the herbs *Celmisia laricifolia*, *Forstera sedifolia*, *Hierochlöe recurvata* and the sedges *Carex kirkii* and *Uncinia nervosa*. Litter cover varies from 1-5% to 50-75% where bryophyte and lichen cover is generally low. Again, adventive presence is minor.

Tussockland classified into Groups 10 and 11 is more restricted than the tussock communities with a prominent shrub element. Generally on northerly aspects or dry, flat areas, altitudes occupied vary from 1070 m to 1450 m. Dominated by narrow-leaved snow tussock or slim tussock , cover ranges from 5-25% to 50-75% and averages 0.3 m to 0.8 m in height. In modified areas blue tussock often replaces the snow tussock species, in places achieving cover of 50-75%. The daisy *Celmisia semicordata* var. *aurigans* is widespread in the ground tier. Other species of more sporadic occurrence and abundance include the subshrub *Brachyglottis revolutus* and snowberry plus the herbs *Schoenus pauciflorus*, *Epilobium glabellum*, sweet vernal, *Blechnum penna-marina* and sedge *Carpha alpina*. Other species which occur infrequently at <1% cover include the herbs *Anisotome brevistylis*, *Plantago lanigera* and sedge *Carex kirkii*.

The herb-tussockland sites are generally found on colluvial slopes of varying aspects ranging in altitude from 1190 m to 1435 m. Dominated by either narrow-leaved snow tussock or slim snow tussock, the widespread subdominant is the conspicuous daisy *Celmisia semicorda* var. *aurigans* or more rarely *C. densiflora* and/or *C. lyallii*. Cover of the dominants range from 5-25% to 50-75% with height averaging 0.3 to 0.8 m. Snow tussock cover has been depleted in places and replaced by blue tussock as the dominant grass. In the ground tier

Widespread species include the subshrub *Brachyglottis revoluta* and the rush *Luzula rufa*. Some of the infrequent species are the shrub *Hebe* sp. (*?subulata*), the herbs *Celmisia brevifolia*, *C. laricifo* *Abrotanella* aff. *inconspicua*, *Poa incrassata*, *Oreobolus impar*, *Anisotome brevistylis* and *Epilobium glabellum*.

The grass/tussock-herbfield sites are dominated in the canopy variously by the daisies *Celmisia semicordata* var. *aurigans*, *C. densiflora* or *C. prorepens* with subdominants most commonly being th subshrubs *Pernettya alpina*, *Brachyglottis revoluta* and the herbs blue tussock with *Raoulia grandiflora*, sweet vernal or *Pratia angulat* abundant in places. Infrequent species include the whipcord shrub *Hebe poppelwellii*, the subshrub edelweiss (*Leucogenes grandiceps*), the cushions *Dracophyllum muscoides* and *Raoulia hectorii*, and several herbs of special significance in the District - *Abrotanella* aff. *inconspicua*, *Gingidia baxterae*, *Celmisia hectorii*, *Cotula pectinata* and *Hectorella caespitosa*. Bryophyte and lichen cover is generally <5% while rock cover averages from 1 to 5%.

A few sites in Groups 10 and 11 have *Marsippospermum gracile* as a prominent subdominant to slim snow tussock which in places is depleted and superseded by blue tussock.

The Groups also include rockfields which were recorded in both Gem Lake and Whitecoomb East cirques (altitude *c.* 1400 m). On these generally well-vegetated boulderfields *Celmisia hectorii* in places forms extensive sheets contributing 5-25% to 50-75% cover. *Celmisia semicordata* var. *aurigans* and the summer-green fern *Polystichum cystostegia* are present in the categories 5-25% and 1-5%, respectivel Other species, include the herbs slim snow tussock, *Colobanthus strictus*, the sedge *Carex lachenalii* and *Celmisia haastii*, plus restricted occurrences in both cirques of the rare and regionally endemic shrub *Hebe dilatata*. Rock cover is included in the cover categories 25-50% and 50-75%.

Group 12 is described as cushionfield or cushion-tussockland, the latter dominated by slim snow tussock (5-25%). This community occurs on the main ridge above Gem Lake and near to Whitecoomb summit (altitude *c.* 1440 m). Dominant cushion species are *Dracophyllum muscoides* and *Phyllachne colensoi* (5-25% and 25-50%); others present are *Celmisia sessiliflora* and *Raoulia hectorii*. Species present, bu of <1% cover include the rare and regionally endemic shrub *Hebe poppelwellii*, the subshrubs *Celmisia brevifolia* and *Chionohebe densifolia*, plus the herbs *Celmisia laricifolia*, *Cotula goyenii*, *Schizeilema exiguum* and *Myosotis pulvinaris*.

Snowbanks feature in Group 13 and were described at six sites located in the high altitude portions of the cirques of Gem Lake and to the east of Whitecoomb summit. Early snowbanks are dominated by *Marsippospermum gracile* (50-75% cover) which decreases in cover the later the snow persists. *Celmisia haastii* is widespread and generally >5% cover. Other species include the cushions *Raoulia subulata* and *Drapetes* aff. *lyallii*, the regionally endemic subshrub *Parahebe trifida*, plus the herbs *Ranunculus pachyrrhizus*, *Epilobium tasmanicum*, *Carex pyrenaica* var. *cephalotes* and *Anisotome imbricata* var. *prostrata*.

Two sites, described by dominants as cushionfield and cushion-mossfield, are included in Group 14. *Sphagnum cristatum* is prominen at both sites which occur in the western Whitecoomb catchment very close to each other at *c.*1040 m. At these species-poor sites the

dominant vascular plants are the trailing subshrub *Dracophyllum pi stratum* or comb sedge (*Oreobolus pectinatus*). Other species include the cushion *Phyllachne colensoi* and the herbs *Abrotanella* aff. *inconspicua*, a sundew (*Drosera arcturi*) and *Celmisia alpina*.

Three sites were classified into Group 15 and recorded from the Whitecoomb West catchment as well as the White Umbrella ridge. These are described as shrub-cushionfield, lichen-shrub-cushionfield and moss-shrubland according to the dominant cover. The most important shrub is bog pine (*Halocarpus bidwillii*), in places achieving 75-100% cover and averaging 0.4 to 0.7 m tall. Dominant ground tier species include the cushion *Donatia novae-zelandiae*, trailing shrub *Dracophyllum prostratum* and subshrub *Myrsine nummularia*. Other distinctive species include the sedge *Oreobolus strictus* and *Gaimardia setacea*. Celery pine was recorded at one site only, on the White Umbrella ridge at *c*. 1090 m. Bryophytes are dominated by *Sphagnum cristatum*, total cover varying from 1-5% to 25-50%.

Group 16 (sedgeland) is represented by sites from the headwaters of Whitecoomb Creek *c*. 1080 m, the wetlands and flushes above Gem Lake (*c*. 1370 m) and also near to its outlet (*c*. 1300 m), plus two flushes in the Whitecoomb East catchment (*c*. 1300 m). The site description based on dominant species varies from moss-cushionfield to sedge-mossfield. The cushionfield sites are variously dominated by the cushion species *Donatia novae-zelandiae* and comb sedge, and the trailing subshrub *Dracophyllum prostratum*. The cushion *Phyllachne colensoi* is present but generally contributes <1% cover. Other species include the sedges *Rostkovia magellanica*, *Carex lachenalii*, *C. gaudichaudiana*, plus sundew and a rush (*Luzula leptophylla*). Slim snow tussock is present but with <1% cover.

Herbfield included in Group 16 is dominated by *Celmisia alpina*, *Euphrasia dyeri* and *Carex pyrenaica* var. *cephalotes*. Other species of note include *Aciphylla pinnatifida* and *Parahebe trifida*, both near the Gem Lake outflow. Large *Donatia novae-zelandiae* cushions with *Hebe poppelwellii* and *Hebe* sp. (*?subulata*) occur in the near vicinity.

The sedge-mossfields in Group 16 are distinguished by their 50-75% bryophyte cover, in which *Sphagnum cristatum* dominates.

Sphagnum also dominates (up to 75-100%) at most sites included in Group 17 and was recorded at high altitudes within the Gem Lake and Whitecoomb catchments. Dominants vary from the shrub *Hebe pauciramosa* (1-5% cover) to the rush *Schoenus pauciflorus* (in places 25-50%), comb sedge (5-25%), and *Gentiana amabilis* (max. 25-50%). Other species include *Aciphylla pinnatifida* (Whitecoomb East and Gem Lake catchments).

Rock bluffs are more extensive in the Cem Lake cirque than in the cirques east of Whitecoomb summit. Consequently, the number of species recorded are greater in the former, *c*. 40 on the southern bluffs and *c*. 38 on the northern bluffs compared to *c*. 18 on the cirque bluffs of Whitecoomb East.

Species of restricted distribution within the District that were recorded here include *Chionohebe thomsonii*, *C. densifolia*, and *Cotula goyenii*. Also present were the shrub *Coprosma serrulata*, the subshrub edelweiss and the herbs *Celmisia laricifolia*, *Hectorella caespitosa* and *Pachycladon novae-zelandiae*.

Species richness of the Whitecoomb summit tors and those bluffs to the west of the main ridge (*c.* 35) is greater than on bluffs within the cirque and includes the shrubs *Coprosma serrulata* and *Hebe buchananii*.

Rock bluffs at *c.* 1100 m in both the Gem Lake and Whitecoomb East catchments are refuges for snow totara. Rock bluffs at this altitude in the Whitecoomb East catchment also support edelweiss while most of the other species present are generally widespread in the mid- to high-altitude plant communities.

Lichens recorded from the Gem Lake/Whitecoomb summit areas by Mr P. and Mrs M. Child in March 1986 are presented in Appendix V .

Landform

Landforms within this recommended area for protection are varied and are reflected in the many different habitats already described.

The Whitecoomb Range forms one of two major fault blocks present within the Umbrella Ecological District (see Chapter 2). The range has undergone uplift possibly combined with some warping and tilting. The altitude attained was great enough to allow minor glaciation in pre-glacial gully heads of which the Gem Lake cirque presents the best example on the range and within the District. A small terminal moraine blocks Gem Lake (see cover) at *c.*1300 m while lateral moraines descend eastwards towards Jordan Creek down to *c.* 1220 m. The cirque's southern spur comprises a colluvial crest while the northern spur is a lateral moraine. Within the cirque itself the initially scoured bedrock has been covered by solifluction debris with deposition of fine material within flushes. Rock bluffs forming the cirque headwall provide examples of ice-worn mammilated buttresses

Seasonal nivation is still in progress with snow persisting in the most sheltered areas until mid to late December. Boulderfields are common on slopes below the rock bluffs.

Below the terminal moraine bordering Gem Lake slumping and earth flow still occur.

Further south, to the east of Whitecoomb summit, there appear to have been three ice origins with the two northernmost cirques apparently glaciated the most. Rock buttresses are present but are not as extensive as those in the Gem Lake cirque. The northernmos Whitecoomb cirque shows evidence of a major slump at its head. Substantial cracks and depressions imply rotation and subsidence of material. Similar features have been observed on the Garvie Mountains and on the Old Man Range at the head of Gorge Creek (Mr M.W. Stirling, pers. comm.).

The Whitecoomb cirques are generally broad with lateral moraines less well-defined than those near Gem Lake. A bedrock bench bounds the southern side of the northernmost cirque whereas on the northern side lateral moraines have been deposited, probably where the ice was deeper. A small but regular feature at *c.* 1220 m in the northern portions of the cirque is most likely to be a lateral moraine rather than either a gravity slump or fault scarp (Mr M.W. Stirling, pers. comm.).

Slumping and earth flow processes appear to be active in all the Whitecoomb cirques. The creek flowing from the relatively ill-defined southern cirque has become in places deeply incised resulting in steep rock bluffs. The largely planar or ripply colluvial slopes are interspersed by some large areas of slumping. To the west of the main Whitecoomb Range the slopes are mainly colluvial, both ripply and planar types being present. Reverse scarplets are present but uncommon. The White Umbrella ridge consists of a plateau surface which has faulted off the main Umbrella Range. Whitecoomb Creek follows a major fault line. The Argyle Burn also exploits a fault, at its head forming a deeply incised gorge. However, the Burn does not appear to be incising a fault line to the south of the gorge.

Soils are predominantly upland yellow-brown earths of the Carrick, Carrick hill and Dunstan steepland series. Parent material is schist solifluction detritus, schist and slope deposits and some loess from schist. Texture varies from silt loams to stony loams. Organic soils, derived from sedge and rush vegetation, and texturally consisting of peats and peaty loams (Kaherekoau soils), occur in the headwaters of Whitecoomb Creek.

Fauna

The fauna associated with this recommended area for protection were the most intensively studied within the District. Detailed reports relating to aquatic fauna, Lepidoptera, Coleoptera and avifauna are contained in Chapter 4 (Sect. 4.3), but the faunal values are summarised here.

Birds recorded were kea, South Island pied oystercatcher, paradise shelduck, southern black-backed gull, skylark, New Zealand pipit, New Zealand falcon and Australasian harrier. Paradise shelduck and southern black-backed gulls were most commonly associated with Gem Lake while South Island pied oystercatchers were common particularly on wetlands. Kea were noted on two occasions. One was heard calling at *c.*1200 m below Gem Lake and a pair was observed on the main Gem Lake ridge at *c.* 1300 m.

Birds associated with the beech remnant were bellbird, chaffinch, blackbird, yellow-breasted tit, yellow-crowned parakeet, rifleman, grey warbler, New Zealand robin and fantail. Sightings and general bird observations made from the Pomahaka Valley to the Gem Lake area by Mr P. and Mrs M. Child in March 1986 are included in Appendix IV.

Shells of the endemic land snail *Powelliphanta spedenii* subsp. *spedenii* were found on the flush areas formed at the outlet of Gem Lake and within the Argyle Burn beech remnant. In the former location it is possible that the shells could have been transported by southern black-backed gulls as some were severely damaged. The shells found in the beech forest were found at altitudes varying from 780 m to 960 m. Several shell specimens were found, two almost intact with little damage evident.

The Whitecoomb Range wetland habitats are relatively undisturbed and unmodified examples of subalpine southern South Island freshwater faunal associations. No snails or ostracods were recorded from Gem Lake and surrounding ponds. Crustacea collected included *Daphnia carinata* King (only in Gem Lake), the endemic species *Echinisca schauinslandi* (Sars) (only on the White Umbrella ridge: S152 894 008), *Microcyclops monacanthus* (Kiefer) and *Boeckella dilatata*

Sars. The *B. dilatata* populations are apparently unique, displaying unusual features of giantism, large clutch size, resting eggs and red pigmentation.

The beetle fauna of the Whitecoomb Range is very diverse and many species were found to be extremely abundant. Eighty-three species of Coleoptera were recorded from the Whitecoomb Range with the majority (73) being recorded in the Gem Lake cirque. Affinities are shared with the beetle fauna of the Old Man Range, the Garvie Mountains and the Blue Mountains.

The Lepidopteran fauna of the Umbrella Mountains shares many affinities with that of the Garvie Mountains and the Lammermoor Range. Many species recorded are not found in Central Otago. The Umbrella Mountains moth fauna is both richer and different from that of the Old Man Range to the north. Ninety-two alpine species were recorded from the Umbrella Mountains, 49 of which were present within the Gem Lake area. Species recorded include those reaching their easternmost limits, westernmost limits and those found from eastern Otago across northern Southland to western alpine areas where they are more common.

Discussion

This recommended area for protection is outstanding within the District terms of vegetation, flora, fauna and landform. The diversity of each is unmatched elsewhere in the District and in general, vegetatio modification is low. Below 1200 m adventive species become more abundant but in only small isolated areas do they achieve dominance. Both floral and faunal elements reach their eastern or western limits on the Umbrella Mountains and several species are of very limited distribution. Gem Lake is one of only a very small number of New Zealand lakes known to be in an unmodified state. It is imperative that exotic fish are not introduced as its values as a scientific baseline are extremely high (see Sect. 4.3). Tussockland communities are vigorous within the area identified, in places reaching the highest cover and height recorded anywhere in the District.

Problems are associated with abuse of wetland bogs by vehicles, particularly on the main Whitecoomb ridge and to a lesser extent on the White Umbrella ridge. Extensive cattle pocking was observed in bogs between the ridge above Gem Lake and Whitecoomb summit. Some active erosion is present on the northerly facing slopes to the west of Jordan Creek as a legacy of past management practices. However, erosion on the banks of creeks in the same catchment is likely to be natural rather than management induced.

The recommended area for protection does not include the majority of the western slopes of the Umbrella Mountains above the Argyle Burn beech remnant and to the south of Whitecoomb summit. Vegetation modification of these slopes is high, and erosion is active. The proposal present here includes the Gem Lake cirque and the catchment down to *c*. 1100 m below which vegetation modification and the proportion of adventives increase markedly. In contrast, the Whitecoomb East catchment is included to Jordan Creek at *c*. 850 m. High natural values are maintained to this altitude within this eastern catchment.

Some of the slopes of the western Whitecoomb catchment have been recently burnt. However, the recovery potential is high with a low representation of adventive species. The latter become more abundant in and around the Argyle Burn but their extent is generally limited.

The area identified includes the wetlands to the north of Ge Lake and follows the 1370 m (4500 ft) contour to include the distinctive North West Bog Ponds (see Sect. 4.3). Wetlands and a buffer zone are included between Gem Lake and Whitecoomb summit.

The northern portion of the Argyle beech remnant is included, particularly for its abundance of celery pine and snow totara, the colonies of *Powelliphanta spedenii* subsp. *spedenii*, and for the stands of red beech. Bog pine and *Donatia novae-zelandiae* cushions are included on the White Umbrella Ridge. The headwaters of the Whitecoomb Creek are distinctive for their extensive *Sphagnum* moss-fields and the large old specimens of *Donatia* on peaty soils.

Area	*c.* 1800 ha	
Altitude range	*c.* 600-1453 m	
Aspect	A great range with catchments trending east, west north and south.	
Plot cards	081 to 086 m	Groups 3 and 4
	087 to 105	Groups 8 and 9
	106 to 138	Groups 10 and 11
	139, 140	Group 12
	141 to 147	Group 13
	148, 149	Group 14
	150 to 152	Group 15
	153 to 162	Group 16
	163 to 166	Group 17
	167 to 171	Rock bluffs
Tenure	Pastoral lease	

UML 02 Waikaia Bush S152 918 105
SN 5380 B/26
SN 5380 C/26

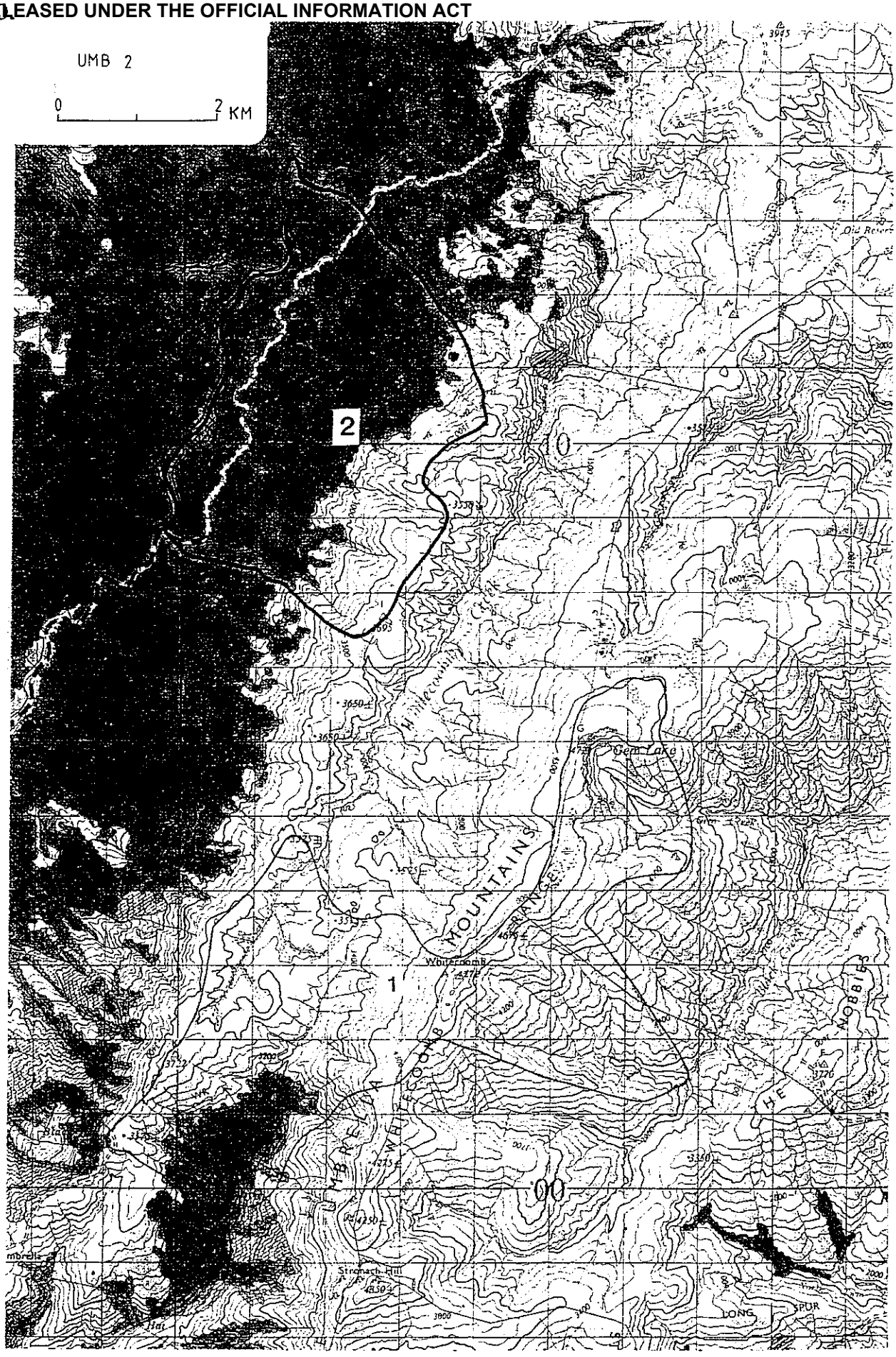
Open red-silver beech forest	on colluvial crest (interfluve) on gully slope
Mixed beech forest	on gully slope on colluvial crest (interfluve)
Rich beech forest	on gully slope on derivative slopes below rock bluffs on ridge top in seep
Shrubland	on colluvial slope
Modified tussockland	on colluvial slope on slumped colluvial slope
Modified tussock-shrubland	on colluvial crest

Vegetation and flora

The beech forest contained within Waikaia Bush is classified into three groups (see Chapter 4): Open red-silver beech forest; mixed beech forest; and rich beech forest. The latter two groups also feature within the Leithen Bush Scenic Reserve.

Open red-silver beech forest was sampled at six sites within the recommended area for protection at altitudes of 350 to 465 m. This forest community is characterised by an open understorey and usually occurs on well-drained sites on ridges or on gully slopes. At most sites red beech (*Nothofagus fusca*) and silver beech (*N. menziesii*) codominate with red beech tending to greater overall canopy cover (up to 50-75%). Mountain beech (*N. solandri* var. *cliffortioides*) reaches the canopy at one site only, contributing little to overall cover. At two sites red beech is the canopy dominant with a cover of 75-100%. Height ranges from 20 to 28 m with a mean of *c.* 25 m. Red and silver beech are the only species occurring in the height tiers 2-5 m and 5-12 m with combined cover generally of 5-25%, rarely 25-50%. In the 0.3 m to 2 m tier the shrub species *Coprosma colensoi*, *C. parviflora*, *C. propinqua* and *C. rhamnoides* are widespread but contribute little to overall cover. Pepper tree (*Pseudowintera colorata*), weeping mapou (*Myrsine divaricata*) and lancewood (*Pseudopanax crassifolius*) feature intermittently. Below 0.3 m plant cover is low, generally including the herbs *Grammitis billardierei*, a filmy fern (*Hymenophyllum multifidum*), *Nertera dichondrifolia* and the hooked sedges *Uncinia angustifolia* and *U. filiformis*. Litter cover is generally high, while bryophyte cover is variable, ranging from 1-5% to 75-100%.

Group 2 (mixed beech forest) was documented at seven sites of differing slope (the steepest being above the Waikaia River), aspect (100° M to 291° M) and altitude (300 m to 600 m). In many respects the sites are located in forest similar to the open beech forest of Group 1. Red and silver beech codominate with an average



canopy height of *c.* 23 m in well-drained positions such as on spurs (interfluves) between gullies and on gully slopes. Combined beech canopy cover is generally in the category 50-75%, at one site mountain beech contributes 25-50% cover to the canopy.

Hall's totara (*Podocarpus hallii*) was not recorded in the northernmost portions of Waikaia State Forest but appeared frequently in the vicinity of Post Office Creek, in places contributing 5-25% cover. The two main beech species codominated in all tiers above 0.3 m. Other species occurring within these tiers rarely exceeded 2 m in height. The widespread understorey shrub and herb species are the same as for Group 1, in addition to broadleaf (*Griselinia littoralis*) which is present from 5-12 m and below 0.3 m but was not recorded in the intervening height tiers. Marbleleaf (*Carpodetus serratus*) features intermittently at heights of <0.3 m. Additional species include the shrub *Coprosma pseudocuneata*, the fern *Blechnum fluviatile*, climber *Clematis paniculata* and a hooked sedge *Uncinia rupestris*.

Group 3, rich beech forest, was described at eight sites over a wide altitudinal range (270 to 825 m). Sites are often on very steep slopes, in many instances bounded by rock bluffs, or are in seepage areas or gullies. Red and silver beech codominate to *c.* 750 m, above which silver beech becomes the sole dominant and average height decreases from *c.* 22 m to *c.* 16 m. Mountain beech attains canopy codominance only in certain limited areas. Hall's totara features as a canopy species (5-25% cover) on the very steep slopes (*c.* 41°) immediately above the Waikaia River (*c.* 270 m). Hall's totara, marbleleaf, broadleaf and lancewood occur as small trees (height 5-12 m) below 750 m altitude with bush lawyer (*Rubus cissoides*) as a climber.

The number of species occurring in the height stratum of 2-5 m increases with decreasing altitude, with this tier being poorly represented above 750 m. At low altitudes (*c.* 240-350 m) species present at 2-5 m include all the small tree species previously mentioned (except broadleaf) plus weeping mapou and pepper tree. *Coprosma linariifolia* was recorded only once. Species 0.3-2 m in height, additional to those above 2 m, include pokaka (*Elaeocarpus hookerianus*), *Fuchsia excorticata*, *Coprosma pseudocuneata*, *C. rhamnoides* and fool's beech (*Gaultheria antipoda*). A species-rich representative gully site at 800 m supports mountain ribbonwood (*Hoheria glabrata*) plus the shrubs *Coprosma cuneata*, *C. pseudocuneata* *Olearia arborescens* and the herbs prickly shield fern (*Polystichum vestitum*) and mountain flax (*Phormium cookianum*). In the herb layer (0 to 0.3 m) additional species include a filmy fern (*Hymenophyllum multifidum*), spleenworts (*Asplenium flaccidum* - also epiphytic - and *A. richardii*) and hooked sedges *Uncinia clavata* and *U. filiformis*. At all sites bryophyte cover is <25%, litter and log cover is generally high.

Rock bluffs, especially in the Waikaia River gorge, support several species ingreater abundance than can be found in the surrounding forest. Species recorded include the small trees, broadleaf and marbleleaf plus the spleenworts *Asplenium bulbiferum*,

A. flaccidum and *A. richardii*, *Blechnum chambersii*, filmy fern *Hymenophyllum multifidum*, *Urtica incisa* and *Schizeilema trifoliolatum*.

Forest margin vegetation (Group 5), as documented at two sites above the bush-line at *c.* 860 m and *c.* 890 m, is shrubland and modified tussockland respectively based on the dominant species but the two sites are similar floristically. The lower site includes silver and red beech in the ground tier (<0.3 m). Dominant shrubs are *Coprosma parviflora*, *C. propinqua* with a combined cover of 50-75% at the shrubland site but < 1% in the tussockland community where narrow-leaved snow tussock dominates (50-75%). In the ground tier, prominent species are variously blue tussock (*Poa colensoi*), browntop (*Agrostis capillaris*), catsear (*Hypochaeris radicata*) and sweet vernal (*Anthoxanthum odoratum*). Hall's totara covers <1% in the ground tier of the *Coprosma* dominated shrubland. Other plants present include widespread tussockland species such as *Blechnum penna-marina*, *Gunnera monoica*, *Geum leiospermum* and the fern ally *Lycopodium fastigiatum*.

The vegetation on the slopes above the forest margin (to 1070 m) was described at four sites which are all included in Groups 8 and 9 (mid- to high-altitude tussock grassland). On the basis of dominants the vegetation is modified-tussockland or modified tussock-shrubland. Narrow-leaved snow tussock is the canopy dominant or codominant in all instances, varying from 1-5% to 25-50% cover. Height averages 0.5 m with cover greatest on south facing slopes. Tussock bases show evidence of recent burning over much of the catchment. *Hebe* aff. *rakaiensis* codominates at one site while blue tussock, browntop, sweet vernal and the subshrub snowberry (*Gaultheria depressa*) are prominent in the ground tier. The small grass *Erythranthera pumila* is locally abundant, reaching 50-75% in one close-cropped sward. The majority of other ground tier species recorded are widespread though the sedge *Oreobolus impar* was only locally common.

Rock bluffs within the catchment above the bush margins near Post Office Creek are *c.* 30 m at their highest point and support *c.* 68 species. The shrubs inaka (*Dracophyllum longifolium*), turpentine scrub, celery pine (*Phyllocladus asplenifolius* var. *alpinus*), *Brachyglottis buchananii*, *Olearia arborescens* and *O. nummularifolia* were recorded on the bluffs overlooking Post Office Creek (at *c.* 1050 m) but not in the surrounding tussockland. Other species such as the subshrub *Brachyglottis revoluta* were abundant on and in gullies between the bluffs.

Rock bluffs on the main White Umbrella ridge support *c.* 52 species. Uncommon species recorded here were the shrub snow totara (*Podocarpus nivalis*) and the fern *Hypolepis ambigua*.

Landform

The White Umbrella ridge is the result of faulting from the main Whitecoomb Range, the SW-NE fault line being currently occupied by the Whitecoomb Creek before it swings through 90° to follow a SE-NW fault line to the Waikaia River.

The Waikaia River in places has cut a deeply incised gorge flanked by schist bluffs. Colluvial slopes between the gorge and the White Umbrella ridge are moderately incised with many narrow steep-sided gullies. Above the present bush-line rock bluffs outcrop both on spurs and on the main ridge. A large area of slumping is present in the area of the Post Office Creek headwaters.

Soils are predominantly high country yellow-brown earths derived from greywacke and semi-schist. They consist of stony loams and silt loams (Waikaia steepland soils).

Fauna

Birds observed were yellowhead, New Zealand robin, fantail, rifleman, yellow-crowned parakeet, chaffinch, bellbird, New Zealand pigeon, morepork, blackbird, yellow-breasted tit, grey warbler, silvereye, New Zealand falcon and New Zealand pipit.

Mr P. Child in May 1975 recorded the following bird species and numbers in the vicinity of Piano Flat in forested and farmland habitats. Those numbering between 1 and 10 were: skylark, song thrush, hedgesparrow, housesparrow, starling, chaffinch, black shag, white-faced heron, paradise shelduck, Australasian harrier, yellow-crowned parakeet, rifleman, yellowhead, New Zealand pipit, and New Zealand kingfisher; and between 11 and 100 were blackbird, goldfinch, redpoll, yellowhammer, spur-winged plover, fantail, yellow-breasted tit, New Zealand robin, silvereye, grey warbler and bellbird. In 1979 the same observer recorded from the upper reaches of the Waikaia River above Piano Flat in both forest and non-forest habitats, the additional species greenfinch, South Island pied oystercatcher, southern black-backed gull, long-tailed cuckoo and brown creeper, each numbering between 1 and 10.

Wildlife Service in February 1980 also possibly recorded a single red-crowned parakeet, a once widespread species now rare in the South Island (Falla *et al.* 1978).

The endemic land snail *Powelliphanta spedenii* subsp. *spedenii* was recorded on the rock bluffs at *c.* 1050 m at the headwaters of Post Office Creek above the bushline. Two live specimens were found, one in the base of a narrow-leaved snow tussock, the other under a bush of turpentine scrub. Three shells were found, in varying states of disrepair.

Long-tailed bats have been reported in the Waikaia Bush area.

Lepidoptera recorded were many and varied, numbering some 69 species in the forest areas and five on the White Umbrella ridge (see Sect. 4.3.3). Intensive light-trapping would be needed to reveal the presence of many species. However, even on the basis of those recorded, the forest is listed as a key invertebrate site (Sect. 4.3.3).

Two species of Carabidae were recorded at 970 m in Waikaia Bush, *Oregus aereus* White and *Mecodema sculpturatum* (G.P.) Blanch, and one of Chrysomelidae, *Adoxia* sp. 3 also at 970 m (see Sect. 4.3.5).

Discussion

The forest included in the recommended area identified, encompasses a range of species-poor to species-rich sites and represents almost the full range of forest communities differentiated within the District (i.e. Groups 1 to 3).

Ross (1979) described seven beech associations within Waikaia State Forest. Of these, those including mountain beech as a canopy dominant on a small number of sites or codominant with red or silver beech were the least represented in the present survey. Red and silver beech associations however were well represented. Red beech prefers dry, fertile habitats whereas mountain beech generally occupies droughted, shallow soils often on steep sites.

Species richness and abundance increases markecly in gullies and also along the Waikaia River gorge. In the latter, rock bluffs support species considered highly palatable to deer, for example broadleaf and the spleenwort, *Asplenium bulbiferum*. Elsewhere, broadleaf is rarely found above 0.3 m in height or belcw 5 m.

Deer and possum sign is widespread throughout the forest area, decreasing only on very steep and otherwise inaccessible areas. Ross (1979) concluded that the deer population of the Waikaia State Forest was compatible with forest health. (However, further deer management was recommended by Wildlife Service personnel during a survey contributing to the National Habitat Register in 1980.) Beech regeneration appeared to be largely ignored in preference to small-leaved *Coprosma* spp. as the main source of browse. The possum population is apparently moderate and nowhere appears to be damaging the subcanopy to a significant degree. Both recreational deer and possum shooting are permitted within the State Forest which is managed as an open indigenous forest under an amendment to the Forest Act 1949.

The road which traverses the forest stand harbours a large number of adventive species, many of which do not extend further than *c*. 5 m from the roadside.

Whilst this recommended area for protection encompasses beech forest representative of northerly and westerly, and therefore drier, aspects the more moist situations experienced to the west of the Waikaia River are not so far represented in a recommended area for protection It is anticipated that any survey of the Nokomai Ecological District which includes the western portions of the Waikaia Forest, will consider representation of the communities west of the Waikaia River. The case for a continuation of the area identified in this report can then be assessed.

The margins to the Waikaia State Forest are largely artificial, having been modified by a history of burning (Ross 1979). The natural bushline, estimated at *c*. 1100m, exists in only a few sheltered situations. Within the reserve proposal the upper forest margin is irregular with some narrow fingers of beech forest extending well above the current dominant altitudinal limit of the forest. On the slopes above the forest, tussock cover is variable, reaching a maximum on southerly slopes. Adventive species such as browntop are scattered throughout, being concentrated in flush areas and on north-facing slopes directly above the forest

margins. The majority of the slopes appear to have been burnt in the recent past (*c.* five years). However, there seems to be potential for high tussock cover on a large proportion of the upper slopes. Active erosion is present on both north and south facing gully slopes. Sheep and cattle sign is widespread on the non-forest slopes and cattle sign is evident, particularly on the forest margins. By contrast, tussock communities on the main White Umbrella ridge appear little modified with adventive presence low.

With regard to fauna the forested areas harbour a full range of forest-associated bird species, in an abundance not recorded in the numerous small remnants existing elsewhere in the District (Wildlife Service National Habitat Register). Yellow-crowned parakeets are particularly numerous while confirmation of a yellowhead population has been recently made by Foord (1985) and also during the course of the present survey (See Sect. 4.3.1).

The finding of *Powelliphanta spedenii* subsp. *spedenii*, a protected species, both as shells and live specimens, is significant. Little is known of this species' distribution, it having been previously recorded from the Mataura Range in Southland (Powell 1979). Meads *et al.* (1984) declared that too little information was available on the species and that a survey of status was required. They also listed habitat modification as being one of the greatest threats to survival of *Powelliphanta* species.

Bats have also been recorded within the forest (Mr G.Loh, pers. comm.). Combined with the rich invertebrate fauna associated with the forest areas, the area identified here is of very high faunal value and is considered, along with the existing Leithen Bush Scenic Reserve, to be a key site. The recommended area for protection is therefor ranked as Priority 1 on both fauna and flora as well as on landform grounds.

Area	1350 ha
Altitude range	230 to 1127 m
Aspect	Predominantly westerly but with steep southerly and northerly facing gully slopes.
Plot cards	244 to 249 — Group 1
	250 to 256 — Group 2
	257 to 264 — Group 3
	Refer also 267
	265 to 266 — Group 5
	268 — Gorge
	269 to 272 — Groups 8 and 9
	273 to 276 — Rock bluffs above forest margin
	Refer also 277 to 283
	284 to 287 (West of Waikaia River)
References:	Powell (1979) Ross (1979) Foord (1985)
	Meads *et al.* (1984).
Tenure	State Forest and pastoral lease.

UMB 07 Crown Rock/Stronach Hill S152 900 957
SN 5380 D/26

Rock bluff vegetation	on ridge
Rockfield vegetation	on derivative slopes below or between rock bluffs
Cushionfield	on ridge
Herbfield	on ridge
Grassland	on ridge
Tussockland	on colluvial slopes

Vegetation and flora

Stronach Hill appears to be the southern limit for the rare and regionally endemic shrub *Hebe poppelwellii* and for the subshrub *Celmisia walkeri* as well as providing the only District record for *Cotula pectinata* var. *villosa*. The summit of Stronach Hill is covered by cushionfield dominated by *Phyllachne colensoi*. In places, blue tussock (*Poa colensoi*) forms extensive mats. While the rock bluffs on the main ridge vary in their species composition and abundance, they harbour species of restricted distribution within the District such as the shrubs *Coprosma serrulata* and *Helichrysum selago* plus the herbs *Aciphylla lecomtei* and *Schizeilema haastii*. *Helichrysum selago* was particularly abundant on the rock bluffs to the north of Crown Rock.

Landform

Prominent rock bluffs on the main crest of the Black Umbrella Range. These, predominantly facing westwards in the southern sections, occur on the ridge top around Crown Rock and face eastwards in the northern sections of the area identified here.

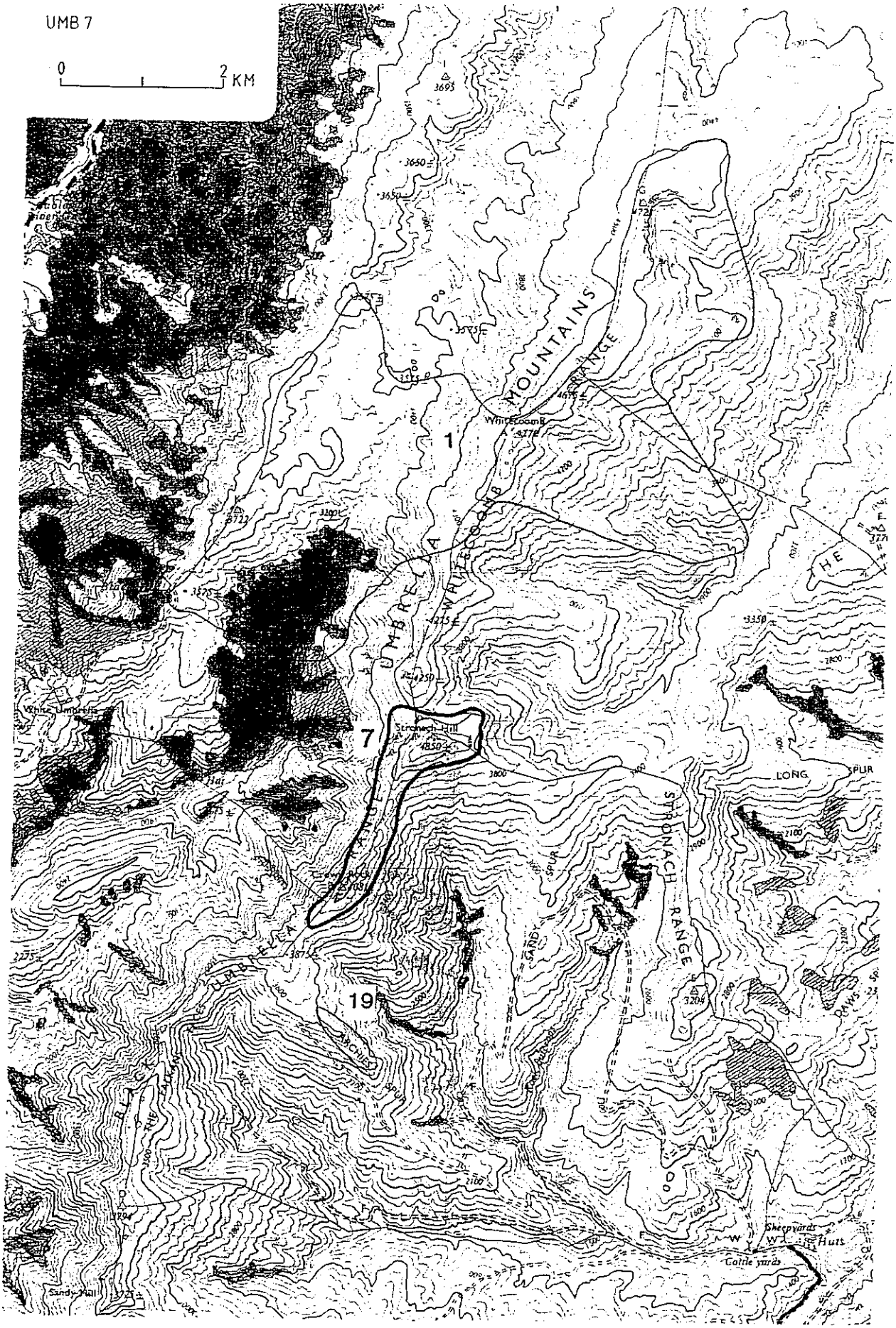
High-country yellow-brown earths with related steepland soils (Waikaia) plus some podzolised yellow-brown earths (Maungatua soils) occur within the area. The former are derived from greywacke and semi-schist with textures of stony loam and silt loam, the latter have parent material of schist and some schist loess and vary texturally from peaty loams to sandy loams.

Fauna

New Zealand falcons were observed along the main ridge on several occasions. Lepidoptera recorded near Crown Rock were *Dasyuris leucobathra* (Meyrick) and *Notoreas perornata* (Walker). *Gelophaula* sp., *Lycaena salustrius* (Fabricius), *Stenoptilia orites* (Meyrick), *Eudonia chalara* (Meyrick) and *'Notoreas' orphnaea* (Meyrick) were recorded from the Black Umbrella Range (see Sect. 4.3.3.).

Discussion

The southern limit for certain plant species and the prominent ridge top landform would normally merit Priority 1 status. However, the plant species, communities and landform are all well-represented in existing or in other recommended areas for protection in the District. *Helichrysum selago* was not recorded in the Leithen Bush Scenic Reserve but is abundant on the Archies Spur rock bluffs (UMB 19). Nevertheless on the basis of invertebrate records, which although limited by the time available were outstanding (Mr B.H. Patrick, pers. comm.: see Sect. 4.3.3) this area is assigned Priority 1 status. The larger



size of the area here described, and the more diverse plant communities surrounding the prominent rock bluffs outweigh the natural values contained within the Archies Spur area (UMB 19).

Western extension is limited by a rapid transition into highly modified tussockland. Some rock bluffs are separated by scree slopes which in certain places are actively eroding. The siutation becomes more acute to the south of Crown Rock. A bulldozed track follows the ridge top fence line.

Area	*c.* 150 ha
Altitude range	1150-1325 m
Aspect	Ridge top with bluffs facing both easterly and westerly directions.
Plot cards	016 refer also 012 to 015, 019 (Black Umbrella Range)
Tenure	Pastoral lease

SOUTHLAND FISH & GAME COUNCIL

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12 July 1995

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The Regional Conservator
Otago Conservancy
Department of Conservation
P O Box 5244
DUNEDIN

For the attention of Tony Perrett

Dear Tony

Pastoral Lease Tenure Review:
Access to Mataura and Waikaia Rivers

1. Glen Lapa

Access to the mainstem of the Mataura in the reach adjacent to Glen Lapa is very important. The Mataura River is recognised in the proposed Southland District Plan as a river requiring an esplanade mechanism (Schedule 6.3 No 28 Parawa to Ardlussa). It is recognised there are, at present, some problems with access there.

On the right bank of the river a legal formed road exists to a ford over a small stream just north of the Cattle Flat Huts at NZMS 260 E44 695957. Legal walking access over an unformed legal road is available from this point upstream along the river edge.

Legal access to the left bank in this vicinity is available upstream to a point at NZMS 260 F44 734913 which is some 5-6 km south of the previously mentioned access at the Cattle Flat Huts.

A private farm track on the Glen Lapa Pastoral Lease does provide vehicle access in the vicinity of F44 725925 and at F44 704974. Due to the lack of access on the left bank over this reach it is highly desirable that the farm track be made into a legal road administered by the District Council. In addition a marginal strip should be created under S24 of the Conservation Act 1987 from the southern most boundary of the Glen Lapa lease to the northern most boundary where this abuts the Mataura River.

The Mataura River has been recognised by the Planning Tribunal, and more recently by the High Court as a river on which there should be gazetted a National Water Conservation Order to protect its brown trout fishery. There is no dispute that these particular waters, in the reach adjacent to Glen Lapa, meet the strict requirements of a National Water Conservation Order. The Dome Burn is an important trout fishing stream and a marginal strip along its banks is necessary to protect this.

2. Argyle

Access to the mainstem of the Waikaia River along the reach where it abuts the pastoral lease is required. These waters are included in the Mataura National Water Conservation Order and listed in Schedule 6.2 in the Proposed Southland District Plan. The fishery values are equal to those on the Mataura in the reach near Glen Lapa.

It is understood that some land on the true right bank of the Waikaia has already been "freeholded". If there is an opportunity to secure a marginal strip along the right and left banks in the reach from NZMS 260 F44 913978 upstream to the northern boundary which adjoins the river at F43 941013 (approx) this would be the most desirable outcome. In this reach, especially in the vicinity of F44 920985 and thereabouts, there are a number of cut-off meanders which form lagoons and backwaters. These contain trout and wildlife and probably several species of native fish so they should be included in the marginal strip. These lagoons would comply with the definition of a river since they do contain flowing water at times of high flow and contain still water at all other times. I enclose a map to indicate where these are.

If possible an access strip should be negotiated at about D44 912987 where the river flows close to the road. There already exists a legal unformed road at this point. (See Cadastral NZMS 261 F44). Another legal unformed road also occurs at a point a little further north, Huttons Road (see Cadastral F44). Access to the river is also possible via Argyle Road along a formed legal road. This should be retained.

We have yet to identify wetland values for Glen Lapa, in the area beside the Mataura River and the fisheries values in the Garvie and Dome burns, as well as the Argyle Burn. It may not be possible to do this until November now. Please advise if there is a particular problem with this.

I hope this information is of use to you. I have not included detailed information about the trout fishery values of the Mataura and Waikaia Rivers. I assume that the recommended Conservation Order status would convince any person that these values are very high and such details are not necessary.

Please contact me if you would like any further information.

Yours sincerely

ff Maurice A Rodway
Manager
SOUTHLAND FISH AND GAME COUNCIL

CADASTRAL MAP