

- (29) KEEN, R.J. (Ed). 1973. *Outdoors, Fiftieth Anniversary Issue (1923-1973)*. Otago Tramping and Mountaineering Club, Dunedin.
- (26) MASON, B.J. 1982. 'A history of skiing on the Rock and Pillar Range'. *Outdoors '82*, Ibid.
- NICOLSON, C.R. 1939. 'A New Type of Hut in Otago'. *Australian and New Zealand Ski Year Book* : 61-62.
- \_\_\_\_\_. 1947. 'Rock and Pillar Reminiscences'. Ibid: 113-14.
- PAULIN, D.G. 1959. 'Rock and Pillar 1938-58'. *New Zealand Ski Year Book* : 39-40.
- SMITH, C.E. and GILKINSON, W.S. 1946. 'Otago Ski Club's New Hut'. *Australian and New Zealand Ski Year Book* : pp 83-85.
- TURNER, BRIAN. (Ed). 1985. *The Guide to Trout Fishing in Otago*. Otago Acclimatisation Society, Dunedin.

## KAKANUI MOUNTAINS

### 1. Landforms

The Kakanui Mountains form the north-eastern boundary of Otago's block mountains. They are somewhat unusual, in that they are part of a major South Island divide stretching from the east coast to the main divide.

The range is a moderately dissected peneplain dipping into the Waitaki, Kakanui, and Waianakarua catchments to the north, with a relatively steep escarpment rising 600-900 m from the Shag Valley and Maniototo Plain to the south. Elevation increases steadily inland from 600-800 m on the outlying Horse Range, to the main Kakanui crest at over 1600 m. Danseys Pass (900 m), lies at the north-western end of the range.

The geology of the greater area consists of faulted greywackes, argillites and semi schists. At Mt. Dasher and Siberia Hill isolated caps of basaltic lava protrude above the 'Hectors plateau'. These are steep, columnar formations which cut through semi-schist by as much as 60 m on Kattothyrst. There are also great tongues of black volcanic rock, in marked contrast to the prevailing landforms of the region.<sup>(1)</sup>

Many upper back-slopes are razor-edged, with deeply incised stream patterns and rugged gullies. As altitude decreases the ridge tops broaden and the land becomes rolling before blending into the North Otago downlands. The latter topography is very distinctive and is associated with mudstone-sandstone-breccia deposits. Spectacular sandstone canyons and weathered outcrops at Trotters Gorge are the best known local features.

### 2. Vegetation and Wildlife

The range experiences a transition between inland and coastal climatic influences. The downlands are well known for their low rainfall and high sunshine hours, yet the tops are often enveloped with damp north-east fogs. Winter snowfall is highly variable from year to year, but cover can persist for 3-4 months on the high crests and plateaus despite their northerly aspect.

Climatic variation is directly reflected by the vegetation.

Extensive areas of broadleaf-podocarp and kanuka forest occupy the Waianakarua catchment at the inland moisture limit for woody vegetation, with only riparian cover in the upper Kakanui Valley and at Trotters Gorge. The extent and composition of this forest has been greatly altered by burning and grazing; totara logs in grassland areas indicate more extensive forest in historical times.

Botanical oddities exist, particularly the large mountain daisy, *Celmisia hookerii*, which is restricted to the Horse Range-Trotters Gorge area. It is now confined to rocky faces inaccessible to stock. Isolated stands of narrow-leaved snow tussock are still to be found almost at sea level near Shag Point.

Tussock grassland is widespread on the range, although it is now greatly modified by pastoralism. Tall tussock has largely been succeeded by 'hard' tussock (fescue and silver), and pasture grasses on sunny aspects below 850 m. Considerable aerial oversowing and topdressing is occurring on these lands. Only on shady faces and upper headwaters does snow tussock persist. This is generally very depleted in both density and vigour. On basaltic areas there are *Sphagnum* moss bogs in association with short tussock.

Shrub associations of *Coprosmas*, *Olearias*, manuka, matagouri, and native broom occur in gully floors.

A range of common bush birds is generally distributed throughout the native forest areas.<sup>(2)</sup> The small bush remnants are important fauna habitats, but most are depleted by domestic stock or by large numbers of wild sheep. These pressures, as well as fire, have no doubt been the major factor in habitat and bird species decline. The New Zealand falcon is distributed throughout the eastern Kakanuis. There have been reports of long tailed and shining cuckoo, and morepork in some bush areas.<sup>(2)</sup>

Red deer and pig are present throughout the eastern Kakanuis.

### 3. History and Land Use

#### 3.1 Maori Occupation:

Maoris were living in the area from as early as 1200 A.D., when moa hunters regularly occupied camp sites along the east coast. With the decline and eventual extinction of moas about 200 years ago, fishing became the mainstay of the local economy, with settlements at the mouth of the Shag River and at Katiki.<sup>(3)</sup>

At the time of the first European exploration, no Maoris were found residing on this coast, but they re-established themselves after a whaling station started at Moeraki in 1836.

#### 3.2 Pastoral Tenure

Pastoral occupation began in 1852, with the issue of the first depasturing licences covering the Horse Range and Waianakarua catchment. These were followed in 1853-54 with licences over the eastern Kakanuis. The inland Kakanuis were occupied by several runs in 1858.<sup>(4)</sup>

Pastoralism continues today, with many run subdivisions and amalgamations during the intervening 130 years.

Most of the lower country is now freehold or Crown land under



*Kattothyrst (centre) and Mt. Dasher (right) from basaltic boulder field on Siberia Hill, the 'Hectors plateau'. Photo: Ken Mason*

freeholding action. Pastoral leases cover all the higher Kakanuis, with the exception of a pastoral occupation licence in the area of Kakanui Peak. Pastoral leases in the south branch of the Waianakarua (with extensive forest cover), at the Pigroot, and in the upper Kauru River have been reclassified as Farm Land in recent years, with most lessees opting to freehold. In the Waianakarua case two thirds of one reclassified pastoral lease was repurchased by the former Lands and Survey Department for reserve purposes.

### 3.3 Industry

A lengthy history of mining commenced in 1863 with the discovery of coal at Shag Point. The river mouth provided a conveniently placed but hazardous port. The underground workings were extended below the sea bed and so provided continual problems of flooding and ventilation. The intermittent operations ceased in the 1950's.

Beach sands along the coast were worked for gold in a small scale during the mid 1860's. Quartz mining in the Shag Valley near Dunback during the 1870's was short lived and small scale. Four small gold dredges worked in this area between 1898 and 1904 with minimal success. This location proved to be one of Otago's lesser gold mining areas although goldfields at the adjacent Maerewhenua and Mt. Ida workings had regional significance.

The Government opened lime kilns at Makaraeo near Dunback in 1899 to satisfy a major need both for building and agricultural lime. In 1909 the works were leased out and have been operated privately to the present day. A hill-top quarry

was opened in 1950, utilising a kilometre-long aerial cableway to a railhead where limestone is transported to Dunedin for cement manufacture.

### 3.4 Communications

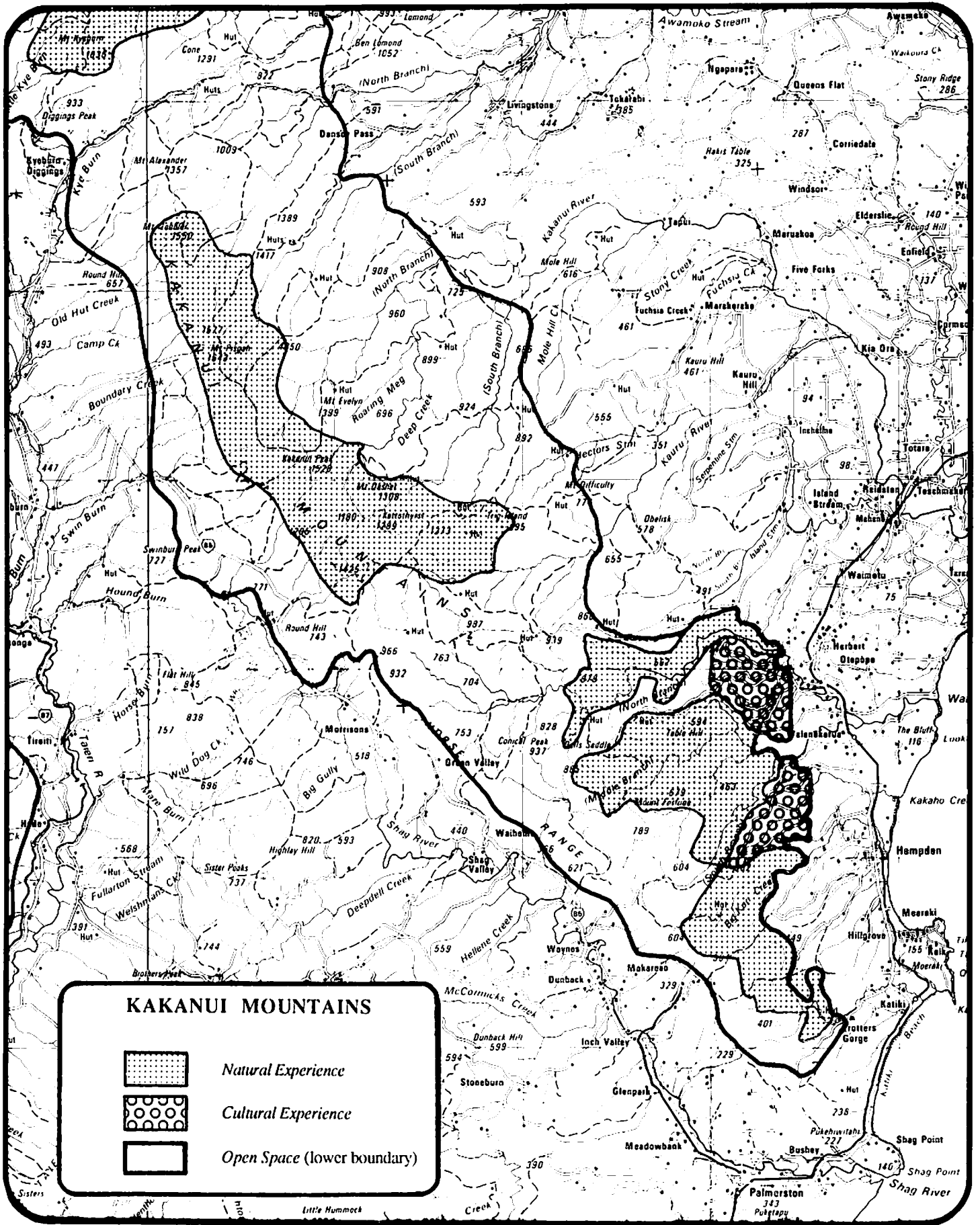
The Kakanuis and Horse Range have always been something of an impediment to communications. In the early 1860's a coach road was formed over the Horse Range, and remained the major east coast link until the main truck rail connection was completed in 1878. This was followed by the main north highway being constructed in the vicinity of the rail route. Telecommunication and radio installations are modern uses.

The Pigroot (State Highway 85) became one of Otago's major routes to the interior with the discovery of gold at 'The Dunstan' (Clyde) in 1862. Its horrific bogs continued to be traversed by wagons and coaches until 1892 when the Central Otago railhead reached Middlemarch. The Pigroot is now a high standard sealed highway.

The tortuous Danseys Pass road dates from goldmining days, and is today a lightly used local road link.

### 3.5 Land Use Capability

The majority of the high country is Class 7, with severe limitations for pastoral use. This roughly coincides with the remaining tall tussock zone which has moderate to very severe wind and sheet erosion, and high potential for erosion under pasture grass cover.<sup>(5)</sup> There is also an area of Class 8 land on Mt. Pisgah.



Land use capability within the hill country can be roughly divided in half between Classes 7 and 6, with moderate limitations for pastoral use on the latter. There has been extensive oversowing and topdressing on the Class 6 country. As can be expected, capability generally improves with decreasing altitude. Much of the Horse Range is zoned Classes 6 and 4.

### 3.6 District Scheme Zoning

The Kakanui are divided between three territorial local authorities: Waitaki, Maniototo, and Waihemo County Councils.

Within the **Waitaki County**<sup>(6)</sup>, most of the Kakanui high country, mainly in the North Branch Waianakarua and Kurinui catchments, is zoned Rural E (water supply), which permits extensive farming to continue as a predominant use, but makes commercial forestry a conditional use. These provisions are carried over into Rural C (extensive farming and scenic) zones which are devised to protect scenic values. There are Rural C zones in the Livingstone-North Branch Kakanui, the Middle and South Branches of the Waianakarua, and in the Trotters-Pigeon creek catchments. Unfortunately the County Council's intention of permitting only those uses which are compatible with scenic quality within Rural C zones, was thwarted at Trotters Gorge by the former Forest Service exercising Crown exemption from the provisions of the Town and Country Planning Act. Most of a recent land acquisition for forestry is Rural C. Effective public input into the whole question of production forestry in this sensitive area was further subverted by road construction and bush clearance several weeks prior to the closing date for public submissions on an environmental impact assessment. The Horse Range to the coast is Rural B (Mixed Farming), the only zone within this county which allows commercial forestry as a predominant use.

The highest crests of the Kakanui Range within **Maniototo County**<sup>(7)</sup> are zoned Rural B (High Country Protection), which provides for retirement from grazing, revegetation, soil and water conservation works, periodic grazing, and huts as predominant uses. Vehicle tracking is a discretionary use. All lower slopes are within a general Rural A zone.

The **Waihemo County**<sup>(8)</sup> side of the Horse Range is all within the County's one rural zone, with 100 ha of bush remnants in Kurinui Creek protected as Designated Places.

### 3.7 Reserves and State Forests

Historically, only very limited areas have been reserved for public use and appreciation.

The 150 ha Trotters Gorge Scenic Reserve dates from 1864 and provides a popular regional amenity. It has recently been enlarged to provide better protection for its regenerating forest. Further enlargements are planned to the north, to incorporate unplanted state forest land. A corridor along part of the Horse Range Road approach to the reserve is also to be transferred to the Department of Conservation (DOC).

The original 128 ha Waianakarua Scenic Reserve, within the Kurinui Creek catchment, dates from 1905. This was due to be transferred to the Forest Service as part of a former land rationalisation exercise, however reserve status and DOC administration is now to be retained.

The 150 ha forested Glencoe Recreation Reserve, in the lower

north branch of the Waianakarua, was revoked in 1982 and incorporated into the Herbert State Forest on the understanding that it become 'protection forest'. The area has now been allocated to DOC.

The 3500 ha Herbert State Forest consists of two main blocks inland from the townships of Hampden and Herbert. It is predominantly exotic plantation but with significant areas of broadleaf-podocarp forest within. These enclaves are to be transferred to DOC. There have been substantial additional acquisitions in the Trotters Gorge-Horse Range area for expanded plantations.

Two recreation reserves and their environs, centred on Shag Point and the Shag River estuary, are subject to scenic reserve and protected private land proposals. A 5 ha area of snow tussock in the vicinity has been gazetted scientific reserve.

Scientific investigation of remaining indigenous forest remnants in coastal Otago has resulted in substantial recent increases in protected lands. In 1985 negotiations were completed on 3800 ha of pastoral lease for a new Waianakarua Scenic Reserve in the middle and south branches of the Waianakarua. A further 1200 ha in the north branch has a protected private land agreement over it.

Approximately half of a proposed reserve in the headwaters of Pigeon Creek, upstream from the Trotters Gorge Scenic Reserve, has been purchased recently for reserve purposes. Land rationalisations between Forestrycorp and DOC in this locality are resulting in 'no planting areas' in mid Pigeon Creek going to DOC. This provides an opportunity for a connecting corridor of public use between the Trotters Gorge and Pigeon Bush reserves.

A reserve proposal on the distinctive 'Hector plateau' is under investigation.

The small roadside Dead Horse Pinch Historic Reserve has been established at The Brothers hills on the Pigroot as an interpretive site of the Otago Goldfields Park.

## 4. Recreational Opportunities

### 4.1 Tramping

Activity tends to be centred on the forested Waianakarua catchment, with its deeply dissected ridge and valley system.



*Trotters Gorge.*

As the only extensive tract of native forest in coastal North Otago it is invaluable for Oamaru and Palmerston trampers and as such, receives regular use by clubs and for bushcraft training.

The Kurinui Creek catchment abuts the South Waianakarua; in conjunction with the Horse and Razorback ranges, and Trotters Gorge further east, the greater area provides extensive opportunities for bush and tussock ridge travel of up to two days duration. In many respects the area is very similar to the Silver Peaks yet it remains unknown to most of Dunedin's trampers. It has potential for considerably greater use.

Over the greater area of tussock grasslands of the Kakanui Mountains there is less frequent tramping activity. Features such as the volcanic caps of Siberia Hill and Kattothyrst, and the high points of Kakanui Peak and Mt. Pisgah are the more usual attractions. Winter snow cover provides another dimension, particularly for ridge climbs from the Pigroot.

The partly tussock covered Razorback Range is used for day trips. Despite its low elevation (580 m) it provides energetic walking along a craggy, undulating ridge in steep hill country. It provides a good vantage point of the settled Shag Valley to the south. The Makareao lime works and a nearby cave provide points of interest on route. There is considerable potential for Walkway routes along the spine of the Razorback Range, with connections through the Pigeon and Trotters creek catchments to Trotters Gorge. This would utilise a mix of farm tracks and untracked terrain.

#### 4.2 Hunting

Forested areas and their margins have a history of red deer and pig hunting. Local deerstalkers have access arrangements with private land occupiers and there are several private huts used by hunting parties.

Wild sheep are present in large numbers throughout the Waianakarua catchment, however until very recently these have not generally been regarded as *sport*. North Otago deerstalkers are now assisting DOC with organised culls of feral sheep within the new scenic reserve. Opossum numbers appear to be moderate to high. Hunting within the Herbert State Forest was controlled by a block system under the former Forest Service, with preference to opossum hunters during winter.

#### 4.3 Walking

There are several popular short bush walks in the Trotters Gorge Scenic Reserve. A combination of spectacular sandstone outcrops, and stream and bush settings provide one of the more significant scenic areas in North Otago. There is potential for further easy walking opportunities in the recent reserve extension.

In the northern block of the Herbert State Forest, an expanding network of tracks through remnant native forest and exotic plantations provide walks of up to several hours duration. These are very popular, particularly during holiday periods. There is scope for further tracking within natural forest settings, including up the lower North Waianakarua from Glencoe. Suitable arrangements need to be made between Forestrycorp and DOC for continuing public access to these attractions and for their on-going maintenance.

Existing 'walks' and 'tracks' in the district provide important recreational opportunities for both locals and visitors, in a



*Headwaters of Middle Branch Waianakarua from Mt. Fortune.*

region that is generally lacking in native forest settings. Most of the higher and inland areas are subject to climatic hazards and are relatively lacking in topographic appeal for general public use.

Coastal walks are locally important, particularly for youth hostellers at Shag Point.

#### 4.4 Skiing

It appears that the range is in a snow shadow relative to most other Otago ranges, and therefore cannot be relied on to provide skiable conditions. When snow cover is sufficient however, extended tours on variable terrain are possible from Obi in the south, along the main crest to Danseys Pass. This is a distance of over 35 km. The crest is relatively narrow with greater variations in gradient than found on most Central Otago ranges. The crest is suitable for both cross country and alpine ski touring in the right conditions.

The 'Hectors plateau' is particularly suitable for cross country skiing. This area's potential was recognised as early as 1947 when an Otago Tramping Club party twice visited the area on ski.<sup>(9)</sup>

During the last few years a rope tow has been occasionally operated above the Pigroot by a local club. Infrequent snow cover is causing declining interest and probable abandonment. This is the likely result of any attempt at skifield development on the Kakanuis.

#### 4.5 Outdoor Education

Opportunities for outdoor education in the eastern Kakanuis have long been recognised by university, school and youth groups. Camp facilities are established at Shag Valley, Trotters Gorge, and Waianakarua which seasonally receive regular use. Walking tracks, coastal and hill country features are used as part of outdoor living programmes.

#### 4.6 Picnicking, Camping, Water Recreation

Open glades in the Trotters Gorge Scenic Reserve provide outstanding settings for passive recreation. At peak periods, demand for space exceeds supply.<sup>(10)</sup> In response to vehicle misuse, noise, and damage, the reserve is now periodically closed to vehicles. There are other picnicking and camping areas within the Herbert State Forest and at Glencoe.

Most picnic areas are closely associated with streams and small rivers. Water quality for recreation is important, especially so

at Trotters Gorge where crystal-clear stream water has a major contribution to the high aesthetic appeal of the reserve. Forestry activities upstream are likely to increase water turbidity and decrease recreational value.

The Shag and Kakanui rivers provide good brown trout fishing for both local and visiting anglers. Due to low flows, only parts of the Shag, Waianakarua, and Kakanui Rivers are suitable for canoeing. However, they provide pleasant settings for 'messaging about in boats'.

#### 4.7 Recreational Motoring

The Pigroot provides an increasingly unique motoring experience, travelling through a lightly settled, hill country area, with tracts of tussock grassland either side of the highway. There are also vistas of tussock-clad faces on the Kakanuis immediately above. The Brothers Hills to the upper Swin Burn is the highest and least modified section. This contains an impressive panorama of red tussock on a tableland adjacent to the highway. This area is still pastoral lease although recently reclassified to Farm Land and therefore available for freeholding. High priority should be given to the protection of tussock landscapes adjacent to the road, in particular west of the Pigroot summit.

The Horse Range Road between Palmerston and Trotters Gorge provides a visually stimulating experience, with considerable diversity in outlook and geomorphic features on route. Remnant clumps of bush and impressive sandstone cliffs provide much of the interest. It is both an interesting through-route as well as a dramatic approach to the Trotters Gorge Scenic Reserve. An owner's initiative to protect bush remnants by means of a Q.E.II open space covenant is a most welcome move. Unfortunately these efforts are being rapidly overshadowed by exotic forest planting either side of the road. This threatens to smother rather than complement the distinctive landforms.

Within the Herbert State Forest, the public was encouraged to use forest roads providing access to areas of interest within, and to the Waianakarua tributaries. Future availability will depend on Forestrycorp's commercial policies.

### 5. Zoning

Within the Kakanui Mountains there are a wide range of recreational opportunities within a diversity of settings. This is reflected in the zoning. Provided the present landscape diversity is maintained, the hill country recreational requirements of the coastal North Otago region can be adequately catered for in the future.

#### 5.1 Natural Experience

The wild land settings of the higher slopes of the Kakanuis, and the remaining native forested catchments are zoned *natural experience*. They form three distinct areas:

5.1.1 An alpine zone generally above 900-1000 m including all the high crests between Obi and Mt. Nobbler, and containing the majority of the remaining tall tussock grasslands. The 'Hectors plateau', with its distinctive volcanic landforms and plant associations is also included in this zone.

5.1.2 The Waianakarua catchment is divided into two *natural experience zones*; the north branch includes remnant forest that is confined within the lower slopes; the larger and contiguous middle and south branches includes forest, shrublands, and short/tall tussock grasslands to skyline crests.

5.1.3 The native forests within the Kurinui and Pigeon Creek catchments are under the greatest pressure from forestry, grazing, farm development, and firewood clearance. Extensive farm tracking within the Pigeon Creek catchment has occurred in recent years, whereas the Kurinui catchment is largely undeveloped. Despite a large degree of modification, the area is capable of reversion to a more natural condition by appropriate protection and management. The higher crests of the Razorback Range are included in this zone in recognition of their high landscape/recreation values.

#### 5.2 Open Space

An extensive *open space zone* includes short and tall tussock grasslands generally above 600 m but down to 300 m on the Horse Range. This is a zone of extensive pastoralism which can continue, within limits, without detriment to recreational values. Most of this zone is 'used' in a visual sense by travellers along roads outside of the area. It is also actively used to provide foot access to and between natural areas.

Much of the zone remains pastoral lease but with significant areas alienated from direct public control. The main management requirement for all these lands is to maintain an undeveloped and open appearance. This can be most directly achieved by the Crown exercising earth disturbance, forestry, and cultivation controls on pastoral leases, and by covenanting and district scheme planning controls on private land. Further exotic afforestation in the Pigeon Creek catchment would degrade and over-power remaining natural landscapes within this catchment.

Three areas require particular attention to protect high landscape values:

- \* Pigroot-Swinburn red tussock tableland;
- \* from the saddle on Horse Range Road northwards down Trotters Creek valley;
- \* unroaded sections of the Razorback Range crest.

#### 5.3 Cultural Experience

This zone includes the Herbert State Forest and immediate environs which provide opportunities for facility orientated activities centred around walking tracks, native forest remnants, watercourses, picnic and camping areas. Expansion of services and facilities within this zone could satisfy many future recreational requirements in the coastal North Otago region.

### 6. Recommendations

6.1 The 'Hectors plateau' reserve investigation take into account landscape considerations, and incorporate Class 8 and severely eroded Class 7 lands from pastoral leases.

6.2 No approvals be given for further firebreaking or vehicle access tracking within the alpine *natural experience zone*.

6.3 DOC initiate protection of remaining native forests in the Kurinui and Pigeon Creek catchments.

6.4 The Trotters Gorge Scenic Reserve be maintained primarily for day use, with no further facilities or activities permitted which intrude into the tranquility of the reserve. With extension of the reserves complex in this district however, consideration should be given to designating a discrete walk-in camping area as a base for extended walking.

6.5 The Waitaki County Council withhold planning consent for forestry within the Pigeon and Kurinui creek catchments.

6.6 The new Waianakarua Scenic Reserve be extended to ridge-line boundaries at the head of the Middle Branch.

6.7 As a matter of high priority, DOC take steps to ensure the protection of tussock grassland vistas between the Pigroot summit and the upper Swin Burn.

6.8 The crest of the Razorback Range be protected by landscape covenants.

6.9 The Maniototo and Waihemo County Councils amend their district schemes to provide for landscape protection in the Pigroot, Horse and Razorback range areas.

6.10 Forestrycorp continue encouragement of recreational activities within areas under its control.

6.11 Public foot access easements be provided at convenient locations across the *open space zone* to future reserves, and surrendered high country.

6.12 Walkways should be confined to coastal and lower hill country, therefore long term plans for walkways to the crest of the Kakanuis, including Siberia Hill and Mt. Alexander, should be abandoned.

6.13 The considerable potential for walkways in the Horse-Razorback range area should be pursued. In particular, the crest of the Razorback Range from Sweetwater Road to the Horse Range Road, with connecting side walkways to McLew Road, and upper Pigeon and Trotters creeks.

## References and Selected Bibliography

### Geology

- (1) BROWN, D.A. 1955. 'The Geology of Siberia Hill and Mt. Dasher, North Otago'. *Transactions Royal Society of N.Z.*: 83(Pt. 2): 347-372.
- GAGE, M. 1957. *The Geology of Waitaki Subdivision*. N.Z. Geological Survey Bulletin No. 55. D.S.I.R., Wellington.
- MUTCH, A.R. 1963. *Geological Map of New Zealand, 1:250,000. Sheet 23, Oamaru*. Ibid.

### Vegetation and Wildlife

- ALLEN, R.B. 1983. *Fire Damage, Trotter's Gorge*. Unpublished report. Botany Division, D.S.I.R., Dunedin.
- \_\_\_\_\_. 1984. *Proposed Tussock Grassland Reserves, Horse Range, Waianakarua Ecological District*. Ibid.
- \_\_\_\_\_. 1986. *Botanical Report, Pigeon Bush, Waianakarua Ecological District, North Otago*. Ibid.
- BRUCE, D.L. 1986. *Botanical Report: Mixed Broadleaved Forest Remnants - The Dasher and*

*Mt. Dasher Pastoral Leases, Kakanui Range, Dansey Ecological District*. Ibid.

- EVISON, HARRY.(Ed). 1978. *Trotters Gorge, A Field Guide*. Friends of Trotters Gorge, Dunedin.
- JOHNSON, P.N. and ALLEN, R.B. 1982. *Waianakarua Valley, North Otago, Botanical Report*. Unpublished report, D.S.I.R., Dunedin.
- MATURIN, S. 1985. *Biological and Cultural Values of Mt. Dasher P 30 and The Dasher P 22*. Unpublished report. Department of Lands and Survey, Dunedin.
- (2) N.Z. WILDLIFE SERVICE. 1981-82. *National Habitat Registers*.
- WARD, G. and MUNROE, C. 1984. *Shag Point Scientific Reserve*. Unpublished report. Department of Lands and Survey, Dunedin.
- \_\_\_\_\_. 1984. *Proposed Shag Point Scenic and Nature Reserves, parts of Shag Point Recreation Reserve*. Ibid.
- \_\_\_\_\_. 1985. *Conservation Covenant (Treble Holdings Ltd.)*. Ibid.
- \_\_\_\_\_. 1985. *Waianakarua Scenic Reserve (Proposed)*. Ibid.

### History

- (3) ANDERSON, ATHOLL. 1983. *When all the moa-ovens grew cold*. Otago Heritage Books, Dunedin.
- GRIFFITHS, GEORGE. 1982. *In The Land Of Dwindle River, A Waihemo Journal*. Otago Heritage Books, Dunedin.
- McDONALD, K.C. 1962. *White Stone Country*. North Otago Centennial Committee.
- McLEAN, GAVIN. 1986. *Moeraki, 150 years of net and plough share*. Otago Heritage Books, Dunedin.
- MOORE, C.W.S. 1958. *Northern Approaches*. Otago Centennial Historical Publications.
- (4) PINNEY, ROBERT. 1981. *Early Northern Otago Runs*. Collins, Auckland.

### Land Use and Planning

- (8) DAVIE LOVELL-SMITH & PARTNERS. *Waihemo County District Scheme, Review No. 1*. Waihemo County Council.
- (6) \_\_\_\_\_. 1986. *Waitaki County District Scheme, Review No. 1*. Waitaki County Council.
- (10) DEPARTMENT OF LANDS & SURVEY. 1981. *Trotters Gorge Scenic Reserve Management Plan*. Department of Lands and Survey, Dunedin.
- (7) JOHNSTON HATFIELD ANDERSON & PARTNERS. 1986. *Maniototo County District Scheme, First Review*. Maniototo County Council.
- N.Z. FOREST SERVICE. 1982. *Environmental Impact Report, Kemp Acquisition - Trotters Gorge, Part Herbert State Forest No. 101*.
- (5) OTAGO CATCHMENT BOARD AND REGIONAL WATER BOARD. 1983. *The Kakanui River Catchment Water Resource Inventory*.
- (5) \_\_\_\_\_. 1983. *The Taieri River - A Water Resource Inventory*.
- \_\_\_\_\_. 1987. *Kakanui River Draft Management Plan*.
- WAITAKI CATCHMENT COMMISSION AND REGIONAL WATER BOARD. 1982. *Waitaki Water & Soil Resource Management Plan, Vol. 2*.

### Recreation

- (9) McLAREN, G.F. 1948. 'A storm on Siberia'. *Outdoors* Vol. 3 (2): 15-18. Otago Tramping Club, Dunedin.
- N.Z. FOREST SERVICE. 1978. *Recreation in State Forests, Today and Tomorrow: 54-55*. N.Z.F.S., Invercargill.

# ST. MARYS RANGE

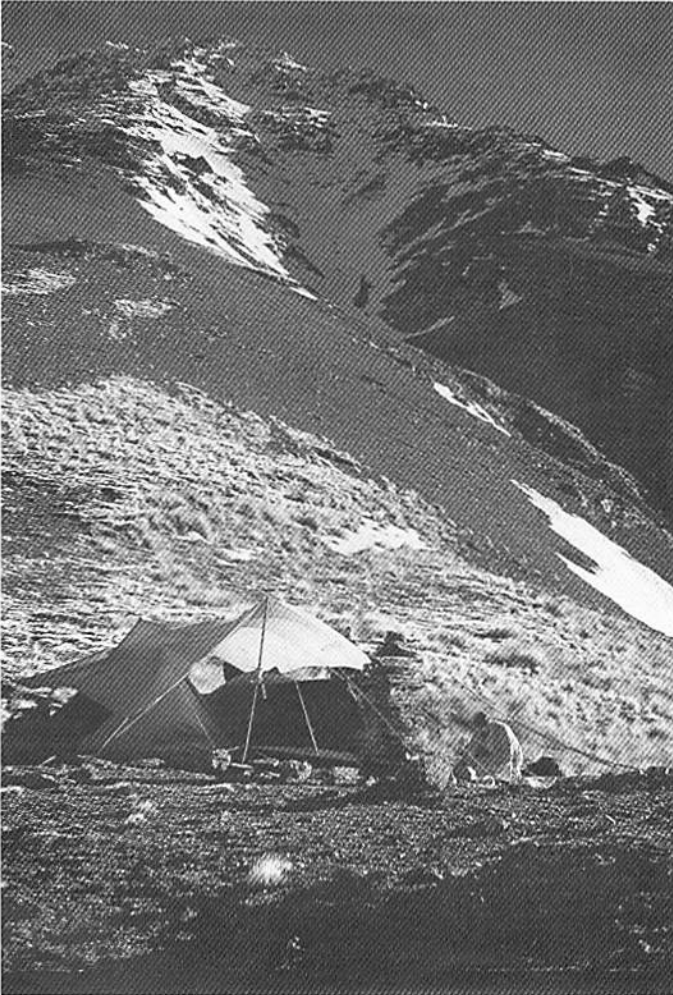
## 1. Landforms

The St. Marys Range, above the Waitaki Valley in the north-east corner of Otago, is more reminiscent of the Canterbury mountains than of Otago's block mountains. Parallel faults on a N.W.-S.E. axis separate the foliated schists of the rest of Central Otago from these greywackes and argillites which tend to fracture into angular blocks.

The range is incised by short, steep drainages into the Waitaki River and by the Otematata catchment to the west. The gently rolling northern crest is from 1520 - 2010 m, with the outlying twin peaks of Mt. Domet (1942 m), Grayson Peak (1660 m) and Cone (1563 m), towards the low Danseys Pass (900 m) to the south. Most of the peneplained crest and many faces are barren lands, consisting of fellfields and coarse scree. Numerous shattered rock outcrops occur along upper faces, and on southern crests.

## 2. Vegetation and Wildlife

On the highest tops only the sparsest of vegetation occurs. Stunted tufts of blue tussock and occasional alpine herb communities occur amongst scree and rock pavement; lichens grow on most bluffs.



Fly camp on Mt. Domet. Photo: Donald Lousley

Snow tussock grassland, usually in a very depleted condition, occurs between 1000 and 1500 m. The narrow-leaved snowgrass dominates lower and sunnier sites, with slim snowgrass on higher, colder sites. Below 1000 m, fescue tussock and low producing pasture dominate, with matagouri and *Olearia* scrub in gullies.<sup>(1)</sup> The tussock grasslands are moderately to severely depleted.<sup>(2)</sup>

The range is within the St. Mary district of the Waitaki Ecological Region.

There is a diverse population of insects and lizards, including a number of insect species endemic to the range.<sup>(1)</sup>

Pigs, deer and possibly chamois are present in low numbers. Pig rootings on the lower, western country causes widespread damage. Rabbits, hares and opossums are also present.<sup>(1)</sup>

## 3. History and Land Use

Pastoralism dates from 1854 when the large Otekaieke Run was first taken up. By 1858 the range was divided up between four runs. Between 1880 and 1883 three of these properties were subdivided by the Government for closer settlement. Subdivision by the Crown has largely produced today's settlement patterns.<sup>(3)</sup>

The St. Marys Range presented something of an obstacle for access to the extensive upland plateau between the Hawkdun and St. Marys ranges. This led to pack-horse tracks being formed across the range, one climbing to over 1500 m.

Gold mining occurred in the Maerewhenua catchment to the east of Danseys Pass, as well as in the Kye Burn to the west. There is some evidence of small scale prospecting along stream beds and terraces. A stone hut once occupied by Chinese miners remains in the upper Otekaieke Valley.

### 3.1 Land Tenure

Present tenure is a mix of pastoral lease, pastoral occupation licence, and properties under freeholding action (deferred payment licences). Many of the earlier Crown leases were small grazing runs, with rights to freehold predating the introduction of the 1948 Land Act. These rights have been exercised up to as recently as 1976, resulting in extensive high altitude lands passing out of the public estate. Crests over 1700 m on the northern end of the range, Mt. Domet and Cone are now privately owned, although the upper Domet slopes are retired from grazing.

In 1981 two pastoral leases in the Danseys Pass-Ben Lomond area were reclassified, but the lessees declined to relinquish their pastoral leases in favour of renewable lease or freehold.

Over 5000 ha of the western crests or eastern flanks are held in pastoral occupation licences.

Within a 33 ha area of Unalienated Crown Land (UCL) in the west branch of the Awakino River, the Waitaki Ski Club has a recreation permit to operate a skifield.

### 3.2 Land Use Capability

The range is predominantly Class 7 and 8, with only small areas of Class 6 in valley floors and on lower slopes. Erosion severity increases with altitude from severe to extreme.<sup>(1,4)</sup>



Catchment authorities conclude that the best treatment for soil conservation and water management is destocking. Some Class 7 land could be subject to grazing permits, but only under rigorous control.<sup>(1)</sup>

### 3.3 District Scheme Zoning

The Waitaki County Council has zoned the bulk of the range Rural D (permits uses compatible with conservation of soil, water, and vegetation cover), being flanked by Rural C (extensive farming and scenic) on the northern, eastern and southern flanks, and Rural E (water quality) on the western Otematata slopes. Within the Rural C and D zones many farm developments require the consent of Council.<sup>(5)</sup>

## 4. Recreational Opportunities

### 4.1 Skiing

The first recorded skiing in the St. Marys Range was in 1939, with the newly formed Waitaki Ski Club using a roadman's hut on Danseys Pass as its base. This continued until 1945 when the hut was blown down, forcing the club to look for new ski grounds.<sup>(6)</sup>

In 1946 the club moved to the west branch of the Awakino Valley where a relatively small basin at 1460 m, overshadowed by a short, steep face provided the main skiing area. Wind drift rather than direct precipitation is responsible for most snow accumulation on this slope. Although the runs are of short duration, interesting skiing is available on steep terrain.



*Awakino Skifield.*

In 1949 the first rope tow was installed and by 1954 a tractor road was extended into the basin.<sup>(6)</sup> The tow was re-aligned in the 1960's and provided a longer run with a vertical height of 274 m. There are also beginners' and access tows. Earlier attempts to extend the ski grounds into a higher basin and across the range into Hut Creek were defeated by winds demolishing a shelter hut and tow lines.

It is most unlikely that any new skifield developments could be successful on the range, due to the severe wind conditions, and the limited extent of suitable slopes.

The existing Awakino field fully warrants continuation, despite its small size, as it meets a local demand and provides a friendly and unsophisticated style of skiing which is appreciated by visiting skiers and locals alike.

The main recreational potential over the greater area is for ski-

touring, both on alpine and cross-country equipment. Dependent on the severity of winds and their effect on snow cover and condition, a variety of tours are possible along the crest of the range.

A climb to the summit of Kohurau (2010 m) and a return run to Awakino is popular. The undulating crest of the range continues northwards from Kohurau, providing up to 20 km of terrain for cross country skiing.



*Approaching summit of Kohurau; Waitaki Valley below.*

### 4.2 Climbing

Mountain clubs regularly use Awakino as a base for snowcraft instruction, as well as the Cone Peak area near Danseys Pass. The high and low peaks of Mt. Domet can provide interesting winter routes and the mountain is a frequent objective of climbing parties. The range is the closest alpine mountain area to Oamaru and Dunedin, and is within day trip range from these centres.

### 4.3 Tramping

In summer the range provides fewer attractions for foot recreation, in comparison to winter. However the upper Otekaieke Valley approaches to Mt. Domet are visited from the Danseys Pass Road, providing easy tramping in interesting terrain. Problems are sometimes encountered obtaining landowner consent for access to this area. Ben Lomond (1052 m) and other local hills are often objectives for holiday-makers at a private camping ground in the upper Maerewhenua Valley. Gold fossicking in old workings and river beds is a popular activity in this locality.

### 4.4 Hunting

The southern St. Marys Range in particular provides significant opportunities for deerstalking which is of considerable interest for local shooters.

## 5. Zoning

### 5.1 Natural Experience

The higher altitude 'wild lands' of the St Marys Range are zoned *natural experience*. The extensive screes and alpine barrens of this range give it a character quite different from the other ranges described in this volume.

The zone should be managed primarily for soil and water

conservation, with a variety of compatible recreational activities encouraged. The existing skifield is relatively smallscale, and an acceptable element in this zone.

Much of the zone is held on pastoral leases and licences, and roughly coincides with a catchment management area identified by the Waitaki Catchment Commission. Wherever possible such tenures should be surrendered to direct Crown control. Limited grazing by permits may be acceptable on less depleted portions of this zone. Reversion to Crown land status is necessary to ensure continued availability for public recreation.

Private land tenures over a large proportion of the range potentially provide an obstacle to recreational use. This needs to be rectified by the Crown purchasing the major interest in these high-altitude lands as opportunities arise.

## 5.2 Open Space

The large scale mid-altitude tussock grasslands are zoned *open space*. Substantial portions in the east and south are in private ownership.

A mix of Crown and local government landscape advice and/or land use controls are desirable to maintain the open settings as viewed from the Waitaki Valley and the Danseys Pass Road. The latter area is particularly sensitive to poorly located farm roading, shelter belts and buildings. Assistance and advice from the Department of Conservation (DOC) and use of district scheme provisions are desirable.

Public foot access requires to be negotiated in key localities for access to the *natural experience zone*.

## 6. Recommendations

6.1 Government progressively apply the Destocking and Surrender Policy on Class 8 and severely eroded Class 7 lands within pastoral leases and licences.

6.2 The Crown negotiate the acquisition of high-altitude private lands equivalent to those in 6.1, as opportunities arise.

6.3 This pool of Crown land be vested in DOC as a Conservation Area.

6.4 Management planning procedures be implemented by DOC to address the issues of skifield activities, recreational use generally, soil and water conservation, permit grazing, and protected natural area requirements. Further roading within the *natural experience zone* should be actively discouraged.

6.5 The Crown negotiate public foot access to the Conservation Area, with priority to the upper Otekaieke Valley from the Danseys Pass Road.

6.6 Wilding pines and their seed sources in the West Branch of the Awakino Valley be removed.

6.7 The Waitaki County Council identify a scenic corridor along the Danseys Pass Road, with assistance from DOC, and extend the adjacent Rural C zone to include this corridor.

## References and Selected Bibliography

### Geology

BISHOP, D.G. 1974. 'Stratigraphic, Structural and Metamorphic Relationships in the Dansey Pass Area, Otago'. *N.Z. Journal of Geology and Geophysics*: 17(2): 301-55.

MUTCH, A.R. 1963. *Geological Map of N.Z., 1:250,000. Sheet 23, Oamaru*. D.S.I.R., Wellington.

### History

(3) PINNEY, R. 1981. *Early Northern Otago Runs*. Collins, Auckland.

### Land Use Planning

(5) DAVIE LOVELL-SMITH & PARTNERS. 1986. *Waitaki County District Scheme, Review No 1*.

(1) HILL, P.H. and HURST, P.A. 1977. *St. Mary's Range Catchment Management Area*. Soil Conservation and Water Management Report. Waitaki Catchment Commission and Regional Water Board.

MASON, B.J. 1986. *Assessment of Classification : Expired Pastoral Occupation Licence: 0 96 Rugged Ridges*. Submission to Commissioner of Crown Lands, Dunedin. F.M.C. and Royal Forest & Bird Protection Society, Wellington.

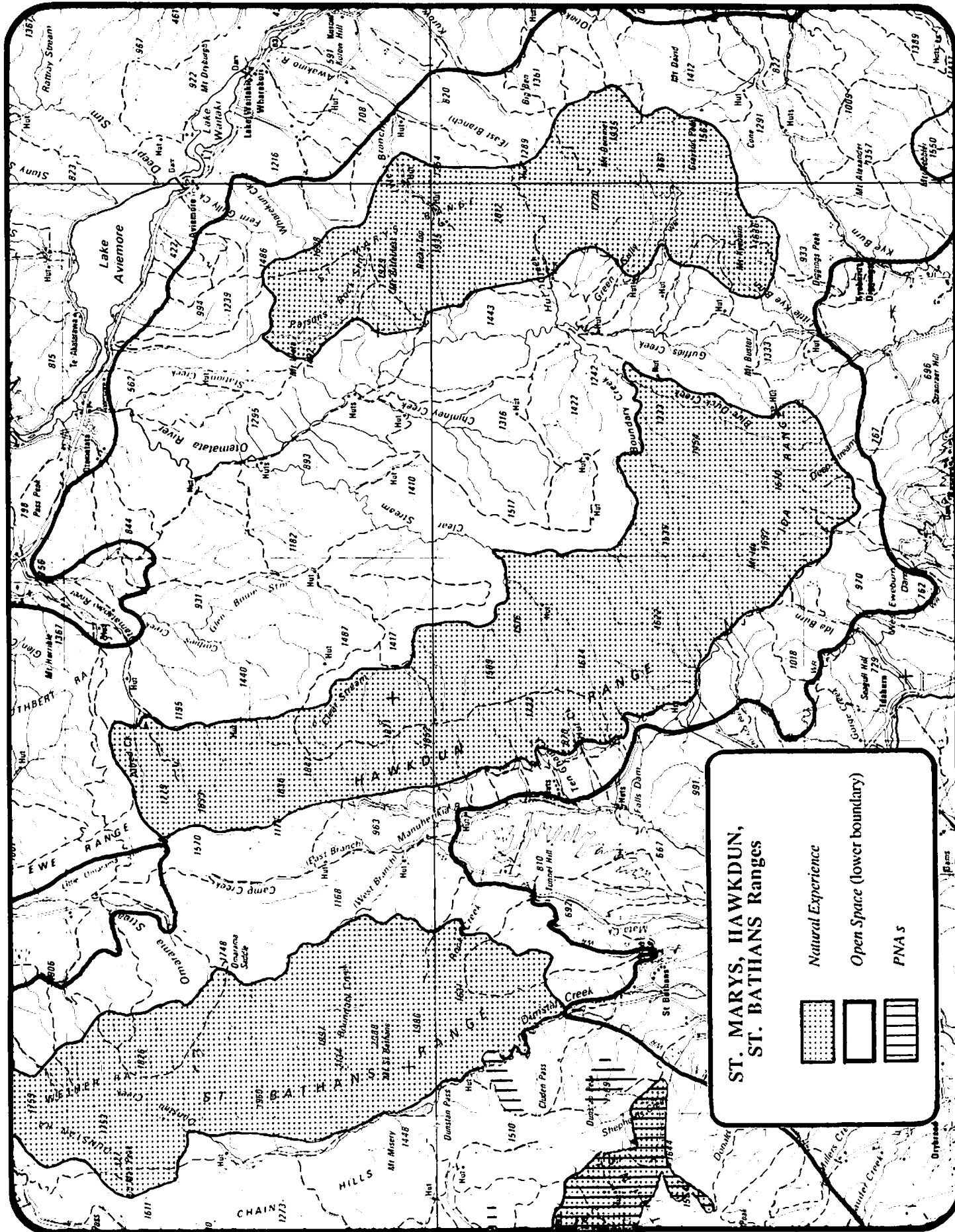
(4) OTAGO CATCHMENT BOARD & REGIONAL WATER BOARD. 1983. *The Taieri River, A Water Resource Inventory*.

SCOULAR, ANN. 1977. *Run Management And Soil Conservation In The Otekaieke-Dansey's Pass Area, 1950-76*. University of Otago, Dunedin.

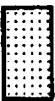


(2) WAITAKI CATCHMENT COMMISSION & REGIONAL WATER BOARD. 1982. *Waitaki Water and Soil Management Plan, Vol. 2*.

### Recreation

(6) N.Z. SKI ASSOCIATION. 1961. *N.Z. Ski Year Book* : 47.



**ST. MARYS, HAWKDUN,  
ST. BATHIANS RANGES**

	Natural Experience
	Open Space (lower boundary)
	PNA S

# HAWKDUN and IDA Ranges

## 1. Landforms

The Hawkdun Range, with its northern and southern extensions, the Ewe and Ida ranges respectively, is a distinctive block mountain formation. It has an uninterrupted length of over 50 km on a north-south axis.

Its steep western escarpment rises between 900 and 1050 m above the Maniototo Plain and upper Manuherikia Valley. This even-crested face is the most prominent feature of the range and it dominates the upper Manuherikia Valley. The eastern slope dips gently into a large and deeply incised peneplain upland drained by the Otematata and Otamatapaio rivers. Part of this is locally known as the 'Hawkdun plateau'. The St. Marys Range rises further to the east.

The crest height increases gradually from 1520 to 1870 m south to north. It is relatively narrow in places due to the action of leeward cirque gouging, creating steep headwalls.

Unlike the schist ranges to the south and west, this non-foliated greywacke range has an absence of tors along its crest. Rock outcrops occur in gullies on the western escarpment, particularly below Mt. Ida. In summer months solifluction features arising from freeze-thaw actions can be seen, particularly on upper east facing headwaters of the Otematata catchment. Patterned ground such as earth hummocks, stone stripes and nets, and polygons are to be found along the higher crests.

## 2. Vegetation and Wildlife

Most of the upper slopes are fellfield, consisting of angular, fractured, dark rock which provides a relatively stable base for a sparse scattering of specialised cushion plants and small shrubs. There are few endemic species; this greywacke range is distinguished more by the absence of species which are found throughout the other Otago block mountains.<sup>(1)</sup> Generally the Hawkduns appear more vegetated than the adjacent St. Marys Range, with less extensive screes on the range flanks.

An unusual feature is the presence of an open cover of slim snowgrass on the 'Hawkdun plateau'. As a result of burning, this species is usually replaced by the tuft-forming blue tussock and alpine fescue tussock. Herbfield communities are virtually absent, probably because of the nature of the parent rock in the alpine zone.<sup>(2)</sup> At lower and drier sites the narrow-leaved snowgrass is dominant, but is replaced on the lower flanks and in gullies by a denser cover of short fescue tussock with matagouri and *Olearia* species.

Snow tussock grassland vegetation is moderately to extremely depleted generally.<sup>(3,4)</sup>

Pigs live in scrubby gullies, venturing out onto the tussock grasslands where their rootings do considerable damage. There is also a low population of red deer, their numbers being kept to a near-zero level by helicopter operators. Hares range over the whole area. Wild sheep are found throughout the Otematata headwaters and in the vicinity of Mt. Ida.<sup>(5)</sup>



*Hawkdun Range from southern slopes of St. Bathans Range.*

Populations of giant scree skink have been identified on the Ida Range.<sup>(6)</sup>

The range is within the Hawkdun district of the Waitaki Ecological Region.

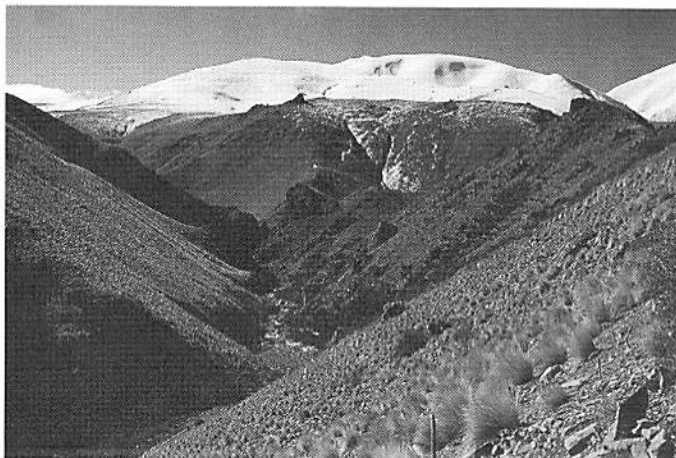
The western flanks of the Hawkdun Range have been advocated for reserve status. This probably provides the best example in the ecological region of an altitudinal sequence of different vegetation types.<sup>(7)</sup> It ranges from red tussock grassland on the valley floor terraces in the upper Manuherikia, to sparse fellfield vegetation on the range crest. The red tussock is under considerable development pressure.

## 3. History and Land Use

### 3.1 Pastoralism

Such high, cold country was not the first choice of pastoralists. It was not until 1858 that pastoral licences were issued, with the bulk of the range divided between two large stations: Hawkdun and Omarama. Mounting pressures from miners and landless farmers for subdivision and closer settlement were not the only problems for runholders. Rabbits swarmed northwards over the range in the early 1880's. During the preceding years, plentiful wekas on Omarama Station had kept a check on the rabbits, but they were overwhelmed by this latter invasion. In 1893, some 300,000 rabbits were killed on Omarama Station alone.<sup>(8)</sup> The high country was very slow to recover from the combined ravages of fire, sheep, and rabbits.

*St. Marys Range and Otematata River valley.*



The 'big snow' of 1895 inflicted heavy stock losses, when snow fell every day for a month. Omarama Station lost 18,000 sheep, to be repeated in 1903 with another 11,000 lost. Hawkdun Station lost 37 per cent of its flock. Losses of 1,500-2,000 per year were regarded as normal.<sup>(8)</sup>

### 3.2 Land Tenure

The Hawkduns and its outliers are predominantly pastoral lease, but with substantial areas of pastoral occupation licence in the Otematata headwaters and on the Ida Range. A substantial area of the northern Ida Range is Unalienated Crown Land (UCL). The Tara Hills Research Station occupies part of the Ewe Range's northern crest. The Mt. Buster end of the Ida Range is freehold. In 1980 three pastoral leases on the flanks of the Ida Range were reclassified as Farm Land. Only one of these remains as a pastoral lease.

### 3.3 Land Use Capability

The entire Otematata peneplain is Class 7, with all higher crests Class 8. It is only on the lowest western escarpments and in the lower Otamatapaio and Otematata that there are Class 6 or better lands. Catchment authorities consider that all Class 8 land should be retired from grazing, with the greater bulk (Class 7) only marginally suitable for pastoral use.<sup>(3,4)</sup>

### 3.4 Lignite Mining

Over several years the Liquid Fuels Trust Board has commissioned feasibility studies on the Hawkdun lignite field in the upper Manuherikia Valley, immediately at the foot of the range. Large scale open-cast mining was investigated, along with a methanol conversion plant and an associated new town of 10,000 or more residents.

Such a development, and any related communications spill-over on to the range, would most probably overwhelm the natural character of the whole district. However in 1987 the Board concluded that methanol production was not economically viable, and decided that no further investigations or development would proceed.<sup>(9)</sup>

### 3.5 District Scheme Zoning

The Waitaki-Maniototo County boundary is along the crest of the Hawkduns. The crest of the range within **Waitaki County** is zoned Rural D (soil conservation), while the Otematata catchment is Rural E (water quality). The Otamatapaio catchment and Ewe Range is Rural C (extensive farming and scenic).<sup>(10)</sup>

The south side of the range's upper slopes is within the **Maniototo County's Rural B** (High Country Protection) zone, making vehicle tracking a discretionary use.<sup>(11)</sup>

## 4. Recreational Opportunities

### 4.1 Tramping

Historically the Ida Range has received much attention for recreation. As a high point, the summit of Mt. Ida (1570 m) has long been an objective for summer visitors to the nearby township of Naseby. Tourist Spur above the Naseby State Forest provides a convenient, but steep walking route on to the Ida Range.

The Mt. Buster gold workings are another destination, by foot or vehicle, to view spectacular white quartz gravel pinnacles,

being unsluiced remnants from their enclosing terraces. From this locality there is potential for through-trips on foot down the Otematata Valley, or over the St. Marys Range to the Waitaki Valley. This would entail two or more days tramping.

### 4.2 Hunting

Pig and quail hunting is popular, particularly within areas accessible by 4WD vehicle. The largest chukar population in Otago is to be found on the Ida Range. This bird frequents bare screes and more open tussock grasslands above 900 m.

### 4.3 Winter Climbing

For several years now, the steep gullies on the south face of Mt. Ida have provided a good training ground for Dunedin climbers to practice ice climbing. Activity is highly variable depending on seasonal conditions. The south and west faces of the Ida and Hawkdun ranges respectively, provide a variety of steep snow climbs.

### 4.4 Cross Country Skiing

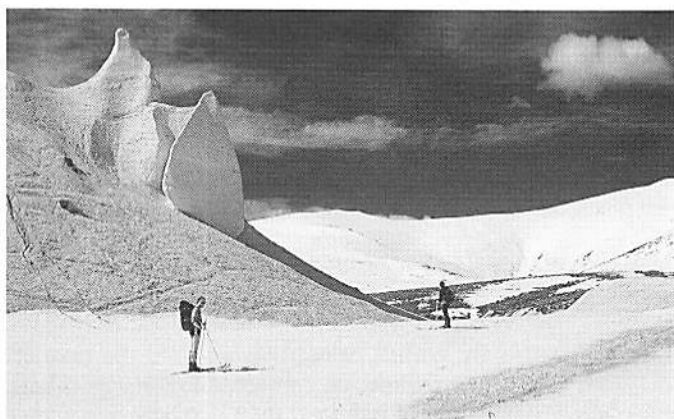
It is cross country skiing which is developing as the main winter use of the Hawkduns. Access onto the range crest usually involves a 900 m climb up the western face. Ice axe and crampons are advisable. Other approaches are from the Otamatapaio Valley or from either end of the Ida and Ewe ranges.

There are over 50 km of crest and the extensive 'Hawkdun plateau', providing considerable opportunity for extended cross country skiing as well as for shorter trips. This area provides some of the greatest scope for cross country traverses in Otago. With favourable snow cover, traverses to the Kakanui Range or Lindis Pass are possible. The terrain is varied, from gentle crests and basins, to steep and very steep gullies and faces.

The Hawkduns perpendicular alignment to the prevailing south-westerlies, results in a lower snowline and more reliable snow cover than adjacent ranges. It also appears to experience less severe winds than either the St. Bathans or St. Marys ranges.

An absence of obvious developments during winter, such as fence-lines, provides an experience of remoteness on a grand scale, which is not always apparent on other Central Otago ranges. The Hawkduns are also off the usual flight paths for light aircraft, which heightens feelings of remoteness.

Along the range crest there is an absence of huts, requiring



*Winter visit to the Mt. Buster sluicings.*

skiers to either camp, snowcave or igloo on the crest, or in a leeward cirque. Much of the high crests of the Hawkduns, and part of the Ida Range, are traversed by vehicle tracks, some of very recent origin. These detract considerably from the natural scene, particularly during snow-free months. However these ranges are one of the few relatively unmodified winter recreation areas left in Central Otago, providing considerable scope for extended, self-sufficient skiing. Such a scarce resource should be cherished, with its *remote experience values* conserved.



Skiing the 'Hawkdun plateau' above the Rambling Gorge.

## 5. Zoning

### 5.1 Natural Experience

Although the lower flanks of the Ida, Hawkdun and Ewe ranges have been partly modified by oversowing and farm access tracks, the Hawkduns overall remain predominantly natural in character. The central, and least modified core is zoned *natural experience*.

The potential for *semi-remote experience* cross country skiing, requires management towards conserving the area's natural values. *Natural experience* zonation is appropriate in this case, as the degree of modification, and relative ease of access precludes a 'higher' status for recreational purposes. However a conscious effort needs to be made to retain *remote experience values*, in addition to natural values. This will require avoidance of incompatible development and regulation of incompatible recreational activities.

The zone contains potentially large reserve areas.

### 5.2 Open Space

The lower, more modified western flanks, most of the Otematata and Otamatapaio catchments, and northern Ewe Range are zoned *open space*.

Within this zone varying intensities of farm access tracking and pasture development have occurred, although extensive areas present relatively unmodified, expansive landscapes. This is particularly the case in the upland Otematata peneplain between the St. Marys and Hawkdun ranges.

The area should function as a buffer for the *natural experience zone*, as well as to maintain open tussock grassland landscapes,

and the recreational opportunities within. The 'Hawkdun plateau' (centred on the Rambling Gorge), Mts. Buster and Kyeburn all provide excellent cross country ski terrain. The former area has *remote experience values* in winter, the latter being within the range of day trips. In summer, historic gold workings and hunting provide significant attractions.

## 6. Recommendations

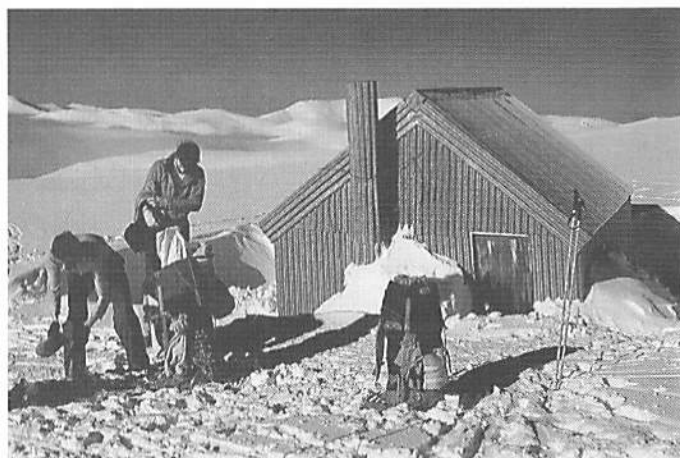
6.1 Class 8 and severely eroded Class 7 lands be progressively removed from pastoral lease and licence tenures within the *natural experience zone* (this will account for the greater proportion of the area).

6.2 The above lands be collectively managed, along with existing UCL, by the Department of Conservation as a Conservation Area.

6.3 A Protected Natural Areas survey be undertaken over the Hawkdun Ecological District to determine minimum protected area requirements.

6.4 Within the *natural experience zone* no further vehicle tracking or other earth disturbances be permitted except to allow retirement fence construction, in which case revegetation of disturbed sites should be a requirement.

6.5 Maintain winter remote experience values within the *natural experience zone*, and on the 'Hawkdun plateau' (*open space zone*), by prohibiting recreational facility developments, over-snow vehicles, and aircraft landings for recreational purposes.



Winter camp, corrugated style.

6.6 Protect skyline crests by encouraging use of alternative sites for communications installations.

6.7 Retain existing legal roads (formed and unformed) as public accessways and provide additional, practical legal foot access to the *natural experience zone*, in particular up the Otamatapaio Valley and to the eastern end of the Ida Range.

## References and Selected Bibliography

### Geology

MUTCH, A.R. 1963. *Geological Map of New Zealand, 1:250,000. Sheet 23, Oamaru.* D.S.I.R., Wellington.

### Vegetation

- (7) CHAPMAN, H.M. 1985. *Botany of the Hawkdun, Benhar, and Ashers-Waituna Study Areas.* Botany Division, D.S.I.R., Dunedin.
- (2) MARK, A.F. and BLISS, L.C. 1970. 'The High-Alpine Vegetation of Central Otago'. *N.Z. Journal of Botany* 8: 381-451.
- MATURIN, SUE. 1985. *Biological and Cultural Values of the Hawkdun and St. Bathans Ecological Districts.* Unpublished report, Department of Lands and Survey, Dunedin.
- (1) MEURK, C.D. 1982. *Alpine Phytocology of the Rainshadow Mountains of Otago and Southland, N.Z. Vols I and II.* PhD Thesis, University of Otago, Dunedin.
- (5) WAITAKI CATCHMENT COMMISSION. 1979. *Hawkdun Range Catchment Management Area.*

### Wildlife

PATRICK, B.H. 1983. 'Lepidoptera of Danseys Pass'. *N.Z. Entomologist* Vol 7(3).

- (6) WHITAKER, A.H. 1985. *A Survey of the Lizards of the Mt. Ida Area, Otago.* Unpublished report, N.Z. Wildlife Service, Wellington.

### History

- (8) PINNEY, R. 1981. *Early Northern Otago Runs.* Collins, Auckland.

### Land Use

- (10) DAVIE LOVELL-SMITH & PARTNERS. 1986. *Waitaki County District Scheme, Review No 1.*
- (11) JOHNSTON HATFIELD ANDERSON & PARTNERS. 1986. *Maniototo County District Scheme, First Review.*
- (9) LIQUID FUELS TRUST BOARD. 1987. *Lignite to Methanol Fuel, Deposit Selection Studies, Final Report.*
- MASON, B.J. 1986. *Assessment of Classification : Expired Pastoral Occupation Licence : 0 91 Soldiers Syndicate-Ida Range.* Submission to Commissioner of Crown Lands, Dunedin. F.M.C. and Royal Forest and Bird Prot. Soc., Wellington.
- (3) OTAGO REGIONAL WATER BOARD. 1980. *Clutha Catchment Water Allocation Plan, Vol. 2*
- (4) WAITAKI CATCHMENT COMMISSION AND REGIONAL WATER BOARD. 1982. *Waitaki Water and Soil Resource Management Plan, Vol. 2.*



Windy conditions on the Ida Range.

## ST. BATHANS RANGE



*Approaching Michael Peak, St. Bathans Range.*

### 1. Landforms

The St. Bathans Range and its northern extension, the Wether Range, lie on a north-south axis between the catchments of Dunstan Creek and the upper Manuherikia River.

This is the highest range in Central Otago, with the main ridge rising over a distance of 16 kilometres from 600 m at the township of St. Bathans, to Michaels Peak (1986 m) and Mt. St. Bathans (2088 m). The range continues northwards for another 18 kilometres on undulating crests, dropping from 2134 to 1750 m at the Wether-Dunstan range junction. (*The Dunstan Range is separate from the Dunstan Mountains further to the south-west*).

The western escarpment rises dramatically in an uninterrupted face the full length of the range, rising over 1200 m from the bed of Dunstan Creek. It is a very prominent feature when viewed from the upper Clutha basin. A series of parallel catchments dissect the considerably gentler back-slope, draining eastwards into the west branch of the Manuherikia River and the Omarama Stream.

Eastern slopes are composed of greywacke and argillite, with the summit crest and western slopes being non-foliated semi schist.<sup>(1)</sup> There are frequent rock exposures along narrow ridges and on steep faces, but with a general lack of tor formations. Scree is extensive on the western escarpment, and on other steep faces.

A series of over-steepened cirques occur along the eastern side of the range crest, and are occasionally occupied by tarns and small lakes. Headwall plucking of the steep western escarpment has tended to narrow and break up the main ridge crest to a greater extent than most Central Otago ranges.



*Cirque with tarn above Omarama Saddle; Ewe Range and northern Hawkduns rear.*

The range is connected to the Hawkduns by a relatively low divide at the head of the Manuherikia catchment, and to the Lindis Pass by the short Dunstan Range.



## 2. Vegetation

Burning and grazing has contributed to an almost total depletion of tall tussock grasslands above 1200 m. Remnant clumps of the slim snowgrass survive on 'islands' of soil raised above the prevailing angular rock fellfield. In some localities, blue tussock provides a more contiguous cover. Lichens and a few herb species cling to stable and sheltered surfaces, in particular on rock outcrops.

Below 950 m tall tussock grasslands are severely to extremely depleted overall<sup>(2)</sup>, with bare surfaces exposed between widely spaced tussocks. Vegetative cover generally increases with decreasing altitude, although snowgrasses are being progressively replaced by fescue and silver tussock.

Shrub species such as matagouri and snow totara, on shady faces and in gullies and valley floors, are indicators of pre-pastoral vegetation, as are isolated clumps of snowgrass, protected within rock outcrops from the ravages by fire.

The fullest possible vegetation altitudinal sequence in Central-North Otago is available on the eastern face of the range.<sup>(3)</sup>

The range is within the St. Bathans district of the Waitaki Ecological Region.

## 3. History and Land Use

### 3.1 Gold

A gold rush to Dunstan Creek in 1863 provided the beginnings of a turbulent period of mining history. 'Deep lead' gold deposits were found as a result of the rush, which led to large scale open-cast mining at Surface Hill and St. Bathans, at the southern end of the range.

Using refined techniques of hydraulic sluicing and elevating, huge quantities of auriferous deposits were processed, with the wastes deposited via sludge channels in to nearby creeks. The picturesque Blue Lake now fills a large depression left by mining. These gold workings and the immediately adjacent goldfield town of St. Bathans are a unique historical precinct on the fringe of the St. Bathans massif.



*St. Bathans Post Office.*

### 3.2 Pastoralism and Tenure

Pastoral occupation commenced in 1858 when the first depasturing licences were issued to Hawkdun and Omarama Stations. Part of the western escarpment provided a boundary for the huge Morven Hills run.<sup>(4)</sup>

Seven pastoral leases and one pastoral occupation licence currently share the range. A public foot accessway is provided to the summit of Mt. St. Bathans up a boundary of the licence area. Other than Section 58 strips part-way up Dunstan Creek, this is the only provision for public access to the range.

A recreation reserve covering the St. Bathans Blue Lake, plus historic reserves within the town are collectively managed as part of the Otago Goldfields Park.

### 3.3 Land Use Capability

All the crests and steep faces are Class 8 with mid-altitude flanks Class 7. The confined valley floors of Dunstan Creek and the west branch of the Manuherikia are Class 6.<sup>(2,5)</sup>

The Otago Catchment Board considers that all the Class 8 and much of the Class 7 lands should be destocked completely so that vegetation rehabilitation can be encouraged. The Board further considers that restricted cattle grazing be permitted on the valley slopes below the retired areas, and notes potential for increased pastoral production on the lower Manuherikia slopes and in Dunstan Creek.<sup>(2)</sup>

### 3.4 District Scheme Zoning

Three territorial local authorities have jurisdiction over the range.

West of the range crest is zoned Rural 1 within **Vincent County**. This has few specific ordinances for landscape protection.<sup>(6)</sup>

The upper south-east of the range is within **Maniototo County's** Rural B (High Country Protection) zone, with vehicle tracking a discretionary use.<sup>(7)</sup> St. Bathans township is zoned Residential 4 (Historic), with the surrounding 'visual catchment' Rural H.

The Dunstan and Wether Ranges, St. Bathans crest and upper Manuherikia catchment is zoned Rural D (soil conservation) within the **Waitaki County**, with the Omarama Stream catchment and Lindis faces Rural C (extensive farming and scenic).<sup>(8)</sup>

## 4. Recreational Opportunities

### 4.1 Skiing

Winter conditions provide the predominant potential for public recreation.

In 1960 reconnaissance surveys began for a skifield in one of the eastward-facing valleys. Since then intermittent investigations have been made, in particular at the head of Rocks Creek, where there is up to 600 m vertical relief above snowline, with gradients suitable for novice to intermediate skiers. Despite its south-east aspect, which should ensure good snow retention, frequent strong westerlies tend to blow snow out of this basin, leaving insufficient coverage over the angular fellfield.

An adjacent basin to the north may have greater scope than Rocks Creek, however no detailed investigations of this site have been made. The period of general observations has spanned 20 years, involving a private investigating company for half that period. It appears unlikely that operation of a skifield on the St. Bathans Range is a realistic proposition.

Increasing use is being made of the range for cross country skiing, indicating its greatest potential for recreational use. A two-day traverse of the Range is possible, as well as a traverse across to the Hawkduns when snow conditions are favourable. The highest ridge crests tend to be narrow and rocky, providing some obstacles to ski use. No huts are available for shelter.

The high altitude and alignment of the range across the prevailing winds can result in rapid snow loss. However the lower Dunstan and Wether Ranges appear less affected by wind. Even leeward basins and ridge crests tend to be affected, exposing extensive fellfield, or creating a rock hazard just under the snow surface. For these reasons the St. Bathans Range is generally less suitable for cross country skiing than the lower Hawkdun Range to the east.

#### 4.2 Tramping

The ascents of Michael Peak and Mt. St Bathans are interesting tramps, particularly if approached from the Manuherikia tributaries and eastern cirque basins. The enclosed valley of the Manuherikia West Branch provides pleasant walking through tussock grassland. The headwaters have *semi remote experience* characteristics.

#### 4.3 Landscape Appreciation

Being the highest Central Otago range, the summit provides an excellent panorama of the alps between Lake Tekapo and the Remarkables. Outstanding perspectives of the Mackenzie basin and of Mts. Cook and Aspiring are obtained. The summit can be approached by foot, and part way by 4WD, from the south and east.

The major public 'use' of the range, however is viewing it from the Clutha Valley. The 1200 m high western face is an imposing feature, during winter appearing as a long white wall.

#### 4.4 Walkways

A long distance walkway has been suggested between the townships of St. Bathans and Naseby. This is unlikely to have popular appeal as it would traverse relatively featureless low country.

Greater public walking opportunities around St. Bathans and associated gold workings would meet a more immediate need. A circuit walkway around St. Bathans is worthy of consideration, traversing both reserve and private land.

### 5. Zoning

#### 5.1 Natural Experience

The remaining natural values of the range warrant protection; the only recreational justification for modification would be for skifield development where the impact can be confined to one, out-of-sight, catchment. In this instance detrimental impacts on natural values could be off-set by the regional benefits arising from a skifield relatively close to Dunedin.

Some modification of the range's landscape has occurred through farm access tracking, particularly up the leading ridge from the St. Bathans township. Other tracking on eastern ridges above Rocks Creek has had less of a visual impact.

#### 5.2 Open Space

The surrounding flanks of the range are zoned *open space*. There are particular requirements for landscape protection on the Longslip Creek faces of the Dunstan and Wether ranges and for provision of public foot access through the zone.

### 6. Recommendations

6.1 Class 8 and severely eroded Class 7 lands be progressively removed from pastoral tenures. Any future grazing to be regulated by grazing permits. Such lands to be collectively managed as a Conservation Area by the Department of Conservation (DOC).

6.2 Crown controls be exercised over earth disturbances, such as farm tracking and fence-line benching, on the western and Lindis faces as well as in the West Branch of the Manuherikia.

6.3 A Protected Natural Areas survey determine priority areas for protection.

6.4 Establish legal rights of public foot access to Dunstan and Wether ranges from State Highway 8, up Dunstan Creek, and up the leading ridge from St. Bathans township.

6.5 Ensure continuation of a public access-way to Mt. St. Bathans on expiry of the pastoral occupation licence.

6.6 DOC instigate an interpretive, circuit walkway within the environs of the St. Bathans township.

### References and Selected Bibliography

#### Geology

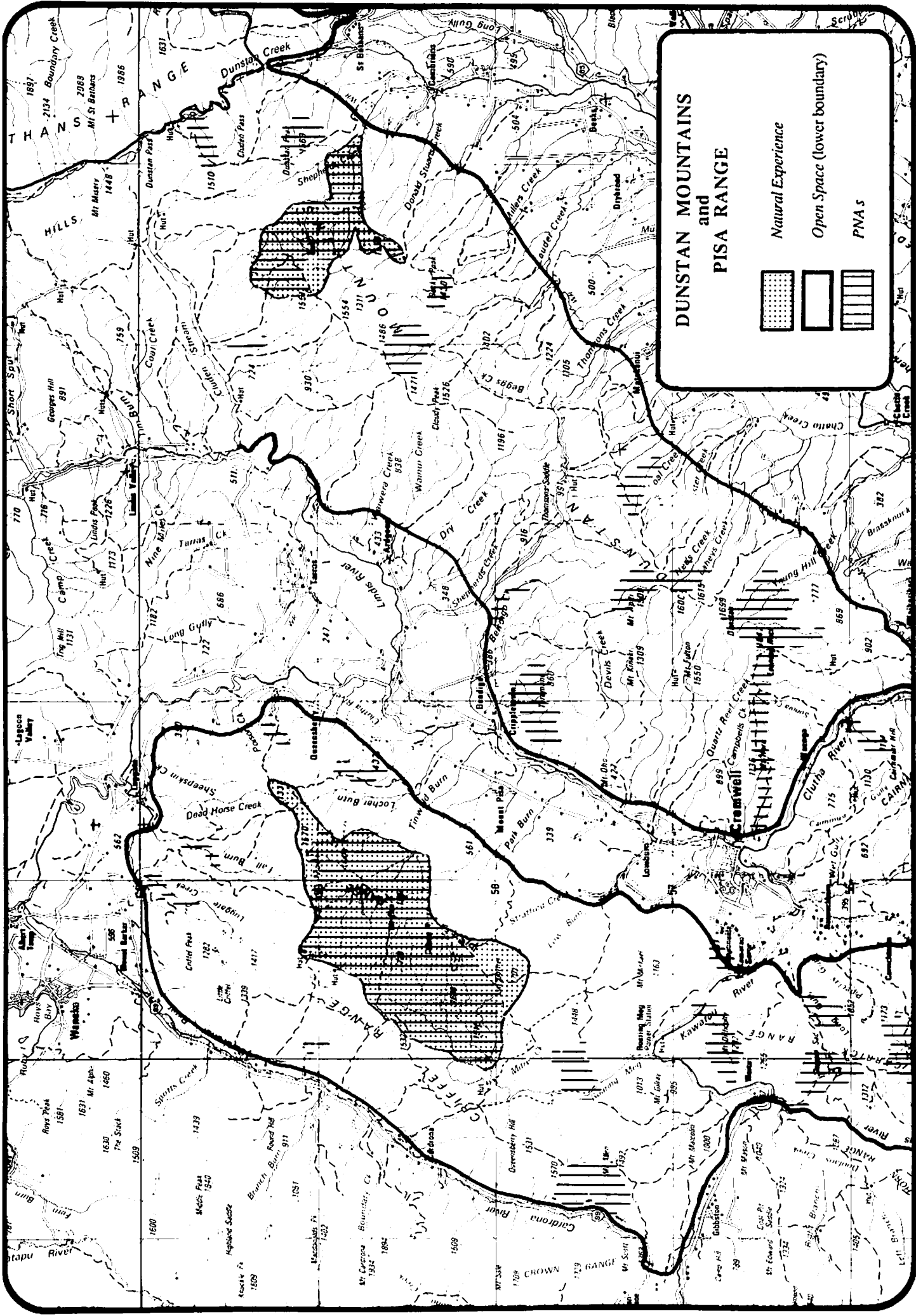
- (1) MUTCH, A.R. 1963. *Geological Map of New Zealand, 1:250,000. Sheet 23, Oamaru.* D.S.I.R., Wellington.

#### History




- DEPARTMENT OF LANDS AND SURVEY. 1983. *St. Bathans An Historic Town (History and Guide).* Otago Goldfields Park publication.
- (4) PINNEY, R. 1981. *Early Northern Otago Runs.* Collins, Auckland.

#### Land Use

- (3) CHAPMAN, H.M. 1985. *Botany of the Hawkdun, Benhar, Ashers-Waituna Study Areas.* Botany Division, D.S.I.R., Dunedin.
- (8) DAVIE LOVELL-SMITH & PARTNERS. 1986. *Waitaki County District Scheme, Review No 1.* DEPARTMENT OF LANDS AND SURVEY. 1983. *St Bathans Reserves Management Plan (Draft).*
- (7) JOHNSTON HATFIELD ANDERSON & PARTNERS. 1986. *Maniototo County District Scheme, First Review.*
- MATURIN, SUE. 1985. *Biological and Cultural Values of the Hawkdun & St Bathans Ecological Districts.* Unpublished report, Department of Lands and Survey, Dunedin.
- (2) OTAGO REGIONAL WATER BOARD. 1980. *Clutha Catchment Water Allocation Plan, Vol. 2.*
- (6) VINCENT COUNTY COUNCIL. 1984. *Vincent County District Scheme, First Review.*
- (5) WATAKI CATCHMENT COMMISSION AND REGIONAL WATER BOARD. 1982. *Waitaki Water and Soil Management Plan, Vol. 2.*



### DUNSTAN MOUNTAINS and PISA RANGE

 Natural Experience	 Open Space (lower boundary)	 PNAS
---	--	---

# DUNSTAN MOUNTAINS

## 1. Landforms

The Dunstans are tilted block mountains of schist, situated between the upper Clutha and Manuherikia valleys. The eastern escarpment rises moderately steeply from the Manuherikia basin. The western slopes have a rough, craggy appearance at their base (the Northburn and Bendigo localities are notable for these landforms), with a pattern of low, shallow valleys and ridges. With increasing altitude the landscape becomes progressively subdued and indistinct as the broad summit crests are reached.

The Cromwell (or 'Dunstan') Gorge truncates the range to the south. A relatively confined area of spectacular mountain tors cluster along the southern summit (at 1669 m); Leaning Rock, locally known as the 'Old Woman Rock', is a prominent skyline feature from throughout the Alexandra district.

The range crest lowers towards its centre to a narrow waist at Thomsons Saddle (900 m).

High tops extend to the northern end of the range above Dunstan Creek, undulating between 1370 and 1676 m. There are relatively few tors at this extent of the range. Several nivation cirques have cut into eastern faces within the Lauder Creek catchment and periglacial soil hummocks are widespread over the summit area.

The Dunstan Mountains are connected to the Lindis country by the relatively low Chain Hills divide between the Lindis and Dunstan Creek catchments.

## 2. Vegetation and Wildlife

### 2.1 Vegetation

The southern Dunstans are considerably modified in their vegetative cover. Herbfields dominated by *Celmisia viscosa*, blue tussock and golden spaniard occupy an extensive high-alpine zone containing only remnant patches of the slim snowgrass. This in turn is succeeded at lower elevations by short tussock grasslands. A rare alpine forget-me-not, *Myosotis albo-sericea*, occurs on the southern crests.

Within the eastern subalpine zone, shrublands dominated by bog pine, mountain toatoa and snow totara occur. Isolated stands of Hall's totara also survive on eastern faces. A narrow belt of tall tussock grassland survives mid-slope on the eastern escarpment, however on the lower semi-arid Cromwell flanks, scabweed, thyme, and depleted fescue tussock is all that remains on large areas denuded by fire, sheep, and rabbits. Within the craggy Bendigo hills, extensive kanuka shrublands occur. In gullies and on shady faces matagouri, native broom and briar have a good hold.

Tall tussock grassland has a more complete presence north of Thomsons Saddle although this is moderately to severely depleted.<sup>(1)</sup> Only a relatively small area of alpine herbfield occurs on the northern crest. Short fescue and silver tussock grassland cover lower slopes. Pockets of shrubland occur throughout this half of the range, being mainly confined to deeply incised gullies.

The Dunstans are contained within their own district of the Central Otago Ecological Region.

### 2.2 Wildlife

In common with the Pisa and Old Man ranges, the pied oystercatcher and black-backed gull use the alpine herbfields for breeding. Other native birds to be found are the pipit, which is common, unlike the thinly distributed New Zealand falcon.

Upland game birds are locally abundant depending on suitable habitat. Californian quail can be found on shady faces and in gullies, while chukar occur at higher elevations.

Small herds of feral goats inhabit parts of the southern Dunstans and pigs are found throughout western shrublands.



Central Dunstan Mountains towards Lindis Valley; St. Bathans Range right.

## 3. History and Land Use

### 3.1 Pastoralism (2)

The first depasturing licences were issued in 1856, to form part of the huge Morven Hills Station. The Manuherikia side of the range was not taken up until 1858, when Lauder and Matakanui Stations were established. Land claims by miners and other settlers saw the progressive subdivision and settlement of the climatically safe, low country. In 1910, Morven Hills and Matakanui stations were subdivided by the Crown into small grazing runs which later obtained conditional rights to freehold. These rights have been exercised over a large portion of the range.

Runholders were plagued by rabbits from the 1880's onwards to the extent that on Lauder Station during the 1920's they were more profitable than sheep. Stock losses through heavy snowfalls were a continuing risk in the high country, with spectacularly high numbers of sheep lost in 1895, and again in 1903.

### 3.2 Communications

The Dunstan Mountains proved to be more of an impediment than an asset for colonial explorers and settlers. Although not particularly high, the range provides a communications barrier between the Manuherikia-Maniototo and upper Clutha basins.

Although pack tracks were developed over Thomsons Saddle and Cluden Pass, the difficult southern passage through the Cromwell Gorge has proved to this day to be the only practical

means of mass communication between Central Otago and the Lakes district. As early as 1897, Government allocated funds for road construction across Thomsons Saddle.<sup>(3)</sup> It was not until the 1970's however that road access was completed. This is a rough formation which is regularly closed by flood damage. It remains largely unused by through-traffic.

The former Post Office has established VHF and microwave installations on the southern end of the range. These skyline masts are visible over a wide area.

### 3.3 Gold Mining

Otago's second major gold rush occurred during 1862 in the 'Dunstan' Gorge, however this left the Dunstan Mountains unaffected. Later gold discoveries along the eastern foot of the range resulted in large-scale sluicing operations from St. Bathans southwards. Mining continued for many years at Vinegar Hill, Cambrians, Drybread, and Tinkers (Matakanui). At the latter site mechanical gold mining continues.

Early alluvial mining also occurred along the western foothills at Quartz Reef Point and Bendigo, however it was not until the 1870's that rich quartz reefs were discovered above Bendigo Creek. This led to 80 years of intermittent underground mining - one of the most extensive and successful such ventures in Otago.

### 3.4 Land Tenure

There are 13 pastoral leases covering the northern, central, and southern segments of the range, with an equal area either freehold, under purchase, or renewable lease with rights to freehold. As the range crest provides common boundaries for all properties, substantial areas of the summit crest is privately owned.

There are just two protected areas within the district. The 13 ha Quartz Reef Point Historic Reserve at Northburn, and a 115 ha protected private land area at Bendigo are managed as part of the Otago Goldfields Park.

### 3.5 Land Use Capability <sup>(1)</sup>

The southern range crest is Class 8, as is a limited area on the northern summit. Mid to higher altitudes are predominantly Class 7, but with substantial Class 6 lands within. The lower Manuherikia and Lindis faces are Class 6.

The Otago Catchment Board sees the need for rehabilitation of vegetation by restrictions on grazing over most range crests. On favourable lower sites there is potential for extension of pasture improvement through oversowing and topdressing. However a large proportion of the range does not have such potential; it remains only suitable for continuation of extensive grazing.

### 3.6 District Scheme Zoning

The whole range is within Vincent County's general Rural 1 zone, with no specific provisions for landscape protection.<sup>(4)</sup>

### 3.7 Protected Natural Areas Survey <sup>(5)</sup>

During the summer of 1984-85, workers from the Department of Lands and Survey inspected the Dunstans as part of the Protected Natural Areas (PNA) Programme.

Approximately 9300 ha was identified as having priority for protection, of which 6500 ha was classified as having 'A'

priority. That is, having high representative value of the natural vegetation-landform variation within the ecological district. They also contain special or unique features.

The remaining 'B' priority areas are of lesser overall representativeness, naturalness and diversity.

It is most unfortunate that a few landholders refused consent for the PNA team to survey their properties. This has affected the selection and boundaries of several priority areas. In particular, the largest area of Hall's totara surviving on the range, and the largest population of *Myosotis albo-sericea* were excluded from assessment.

Major proposals entail:

#### 3.7.1 Northern Dunstans

An area of 2700 ha on the northern Dunstans was the surprise find of the PNA survey. An extensive area of slim snow tussock grassland survives as a distinctive cap on summit crests, with abrupt lower edges reflecting past fire boundaries. There are also periglacial features such as soil hummocks and localised solifluction lobes on the crests.

Within the Shepherds Creek catchment is a wide variety of woody native vegetation dominated by broadleaf treelands, being a remnant of far more extensive forests in Central Otago several hundred years ago. A site investigated for skifield development is within the priority area.

This PNA provides an altitudinal sequence from 640 m in Shepherds Creek in the east, to the unnamed highest point on the Dunstans at 1676 m, through the head-basin of Lauder Creek, and part way down the drier, and more modified Cluden Stream faces to the west. The area is assessed as having 'outstanding significance'.

#### 3.7.2 Fairfax Spur - Leaning Rock

An area of 2380 ha on the southern Dunstans is accorded priority 'A' for protection. This is an elongated 'finger' along the upper faces of Fairfax Spur above the Cromwell Gorge, providing altitudinal sequences of climate, soils, and vegetation, between high-alpine (at Leaning Rock) to semi-arid lowlands at Cromwell. This is one of the driest parts of New Zealand. It also contains examples of the pastorally induced short tussock and cushion herbfields so prevalent on this and adjacent ranges.

A special feature of the PNA is the high concentration of large, spectacular rock tors, in a variety of forms. These extend northwards along the eastern lip of the range crest for approximately three kilometres.

#### 3.7.3 Bendigo

Approximately 750 ha of kanuka shrublands, in the craggy topography west of the 'Logantown' (Bendigo goldfield) area are given 'A' and 'B' priorities for protection. In conjunction with the area within the Otago Goldfields Park, this is one of the most distinctive landscapes in the upper Clutha basin.

Within the 'B' priority area the runholder has established a deer farm and trophy hunting venture under recreation permit.

#### 3.7.4 Conclusions

The Dunstans are one of the more human-modified ranges in Central Otago. Pastoral activities, in a semi-arid climate, have

largely destroyed the tall tussock grasslands at lower altitudes. Only vestiges remain at higher elevations, there being only one substantial area left.

The PNA survey has highlighted the precarious existence of the Dunstan's natural areas which are mostly small and widely scattered, with the central area now being devoid of notable natural qualities. Only 10 per cent of the ecological district was identified as worthy of PNA status, and this is an area where extensive pastoralism has been the only major land use to date. This survey has reinforced the urgent necessity for completing the PNA programme in pastoral high country - in this instance at least, the programme's motto of 'retain the best of what remains' is deficiently true.

The PNAs on the Dunstan Mountains have limited value for public recreation. It is only at Bendigo and in the environs of Leaning Rock that PNA status coincides with areas of high public interest. The Northern Dunstan PNA is an unknown as far as the recreational public is concerned, although no doubt this situation will change with greater awareness of its natural values, and of its potential for cross country skiing.

## 4. Recreational Opportunities

### 4.1 Cross Country Skiing

The range appears to be in a 'snow-shadow'. Combined with its relatively low altitude and end-on alignment to cold fronts from the south-west, it generally receives less snowfall than adjacent ranges. In many winters there is insufficient snow cover in comparison to alternatives, to attract many cross country skiers. However, a heavy snow-cap can persist for

several months some years. The northern summit appears to have more suitable terrain and consistent snow cover than the southern Dunstans, providing opportunities for either local tours or extended traverses around the headwaters of Lauder Creek.

### 4.2 Skifields

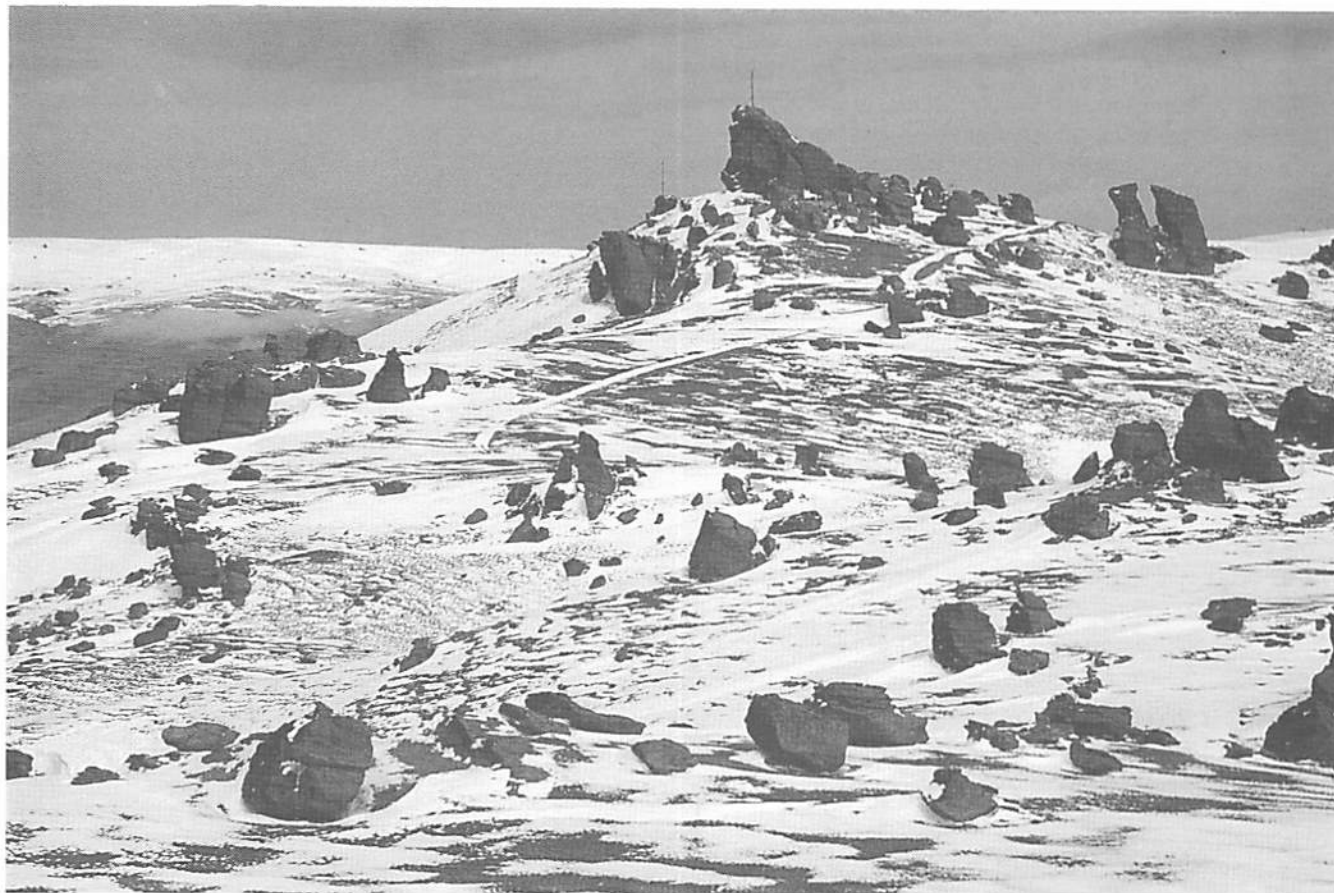
In recent years a basin in Shepherds Creek on the northern Dunstans has been investigated for skifield development. A short rope tow was installed above the main basin to test the area's suitability. An application for a recreation permit has been withdrawn due to lack of runholder consents necessary for road access construction.

The terrain varies from beginner slopes on ridge crests, to intermediate slopes in a basin with a favourable south-easterly aspect and a vertical height of approximately 250 m. There appears to be no technical difficulties in road construction. Within the limitations of seasonal variability in snow cover, there is potential at this site for a small commercial or club field. It is probably the only favourable site on the range for skifield development. Environmental controls would have to be stringent however, with minimal earth disturbances, for any development to be permitted within the PNA. The slopes are equally suitable for cross country or telemark skiing.

### 4.3 Tramping

Hot, semi-arid conditions, with an absence of features, provides little of general interest for summer tramping over much of the range. A climb up to Leaning Rock from the vicinity of Clyde is one exception. Excellent views of the Alexandra basin, Cromwell Gorge, and Wakatipu peaks are obtained. There are many botanical and geomorphological features of

*The Leaning Rock tor complex; Old Man Range rear.*

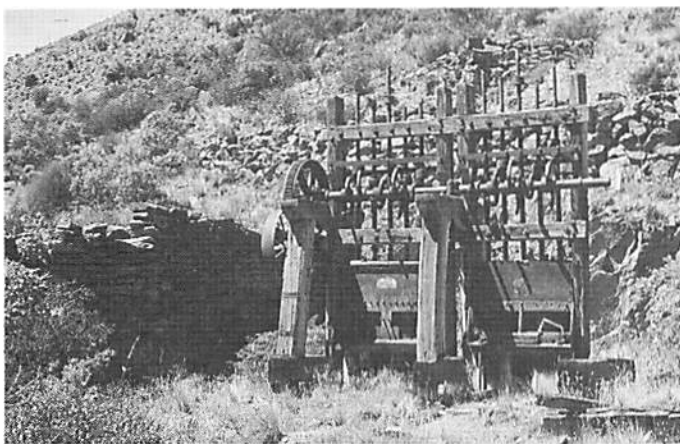


more specialist interest. With greater awareness of the features identified by the PNA survey it can be anticipated that summer visitation will increase.

#### 4.4 Historic Goldfields

In contrast to the above, historic remnants along the eastern and western flanks provide much of public interest. The adobe settlements of Matakani and Cambrians are now largely holiday settlements, with nearby sluiced faces and gullies providing interest. A spectacular example of sluicings survives at Drybread, free from obscuring weeds and modern mining.

At Quartz Reef Point near Lowburn, an outstanding example of hand-stacked rock tailings survives from an early era of 'ground sluicing'. An intricate pattern in the form of 'herringbones' has been created as a high level terrace was washed away for its gold. This unique area is now reserved as part of the Otago Goldfields Park. Unfortunately no public access has been provided.



Ten-stamp battery, Bendigo.

Scores of vertical shafts pepper the surface at Bendigo, making a potentially hazardous experience for the unwary visitor. With public road access available right into the central mining area, Bendigo has become the most visited quartz mining area in Otago. Shafts up to 170 m deep, spoil heaps, battery foundations and stone miners' huts provide features of considerable public interest. An abandoned 10-stamp battery is the last surviving relic of machinery still to be found in the Bendigo area. It is disappointing that an interpretation and public safety programme has not been undertaken since this area was added to the goldfields park. It is an historical resource of regional significance - its management should reflect this.

#### 4.5 Game Bird Hunting

Due to ease of access, the slopes above the Cromwell Gorge have become a favourite hunting area for quail and chukar. Both species are widely distributed along the range.

### 5. Zoning

#### 5.1 Natural Experience

The headwater basin of Lauder Creek, centred on the Northern Dunstan PNA, is zoned *natural experience*.

The area is only lightly modified by farm tracking or other developments, and comprises the largest natural area in the

Dunstan Mountains. The outstanding significance of the area for nature conservation requires a high level of protection, plus legal availability for public use.

The overall undeveloped character of the Lauder Creek catchment should be retained, with any further proposals for skifield development subject to full environmental scrutiny prior to any approvals being given.

#### 5.2 Open Space

The greater balance of the range is zoned *open space*.

This zoning recognises the highly modified landscapes resulting from extensive tussock depletion, pasture development, and vehicle tracking. Isolated features require protective management. These are the identified PNAs, historic sites, and summit top landscapes. Rights of public access through the zone need to be retained and extended.

### 6. Recommendations

6.1 The Department of Conservation (DOC) negotiate the surrender from pastoral lease of the Northern Dunstons PNA, to become Scenic Reserve, in recognition of its outstanding natural values and potential for recreational use.

6.2 Crown consents for burning, earth disturbance, or other pastoral developments be withheld within the above PNA pending reservation, and for the one peripheral non-reserved pastoral lease area within the *natural experience zone*.

6.3 Public foot access easements be provided to the future Northern Dunstons Scenic Reserve from Cambrians, and the Cluden Stream valley.

6.4 Further skifield investigations be undertaken to determine site suitability, and likely impacts of development on natural values.

6.5 Crown ownership be retained of all high country remaining in pastoral lease that is suitable only for extensive grazing (Classes 7 and 8).

6.6 The Vincent County Council extend its Rural 2 (Landscape Protection) zoning to the southern and northern range crests.

6.7 Public foot access be provided :

- \* to Leaning Rock from the Waikerikeri Valley:(no legal access exists);
- \* between a dead-end legal road at Mt. Moka (near Thomsons Saddle), and a land-locked 'paper road' along the southern crest.

6.8 DOC immediately undertake a public safety and historical interpretation programme at Bendigo, and provide public access to the Quartz Reef Point Historic Reserve.

### References and Selected Bibliography

#### Geology

- MUTCH, A.R. 1963. *Geological Map of New Zealand. 1:250,000. Sheet 23, Oamaru.* D.S.I.R., Wellington.
- WOOD, B.L. 1963. *Ibid. Sheet 22, Wakatipu.*

## Vegetation

- MARK, A.F. and BLISS, L.C. 1970. 'The High-Alpine Vegetation of Central Otago, N.Z.' *N.Z. Journal of Botany* 8: 381-451.
- MATURIN, S.E. 1984. *Biological and Cultural Values of the Dunstan Ecological District*. Unpublished report. Department of Lands and Survey, Dunedin.
- (1) OTAGO REGIONAL WATER BOARD. 1980. *Clutha Catchment Water Allocation Plan, Vol. 2*.
- (5) WARD, C.M., BRUCE, B.L., RANCE, B.D., ROOZEN, D.A. 1987. *Lindis, Pisa, and Dunstan Ecological Districts. Draft Survey Report for the Protected Natural Areas Programme*. Department of Lands and Survey.

## History

- (3) DUFF, G.P. 1978. *Sheep may safely graze. The story of Morven Hills Station and the Tarras District*. The author, Tarras.
- PARCELL, J.C. 1951. *Heart of the Desert*. Otago Centennial Publications, Dunedin.
- (2) PINNEY, R. 1981. *Early Northern Otago Runs*. Collins, Auckland.

## Land Use

- (1) OTAGO REGIONAL WATER BOARD. 1980. *Clutha Catchment Water Allocation Plan, Vol. 2*.
- (4) VINCENT COUNTY COUNCIL. 1984. *Vincent County District Scheme, First Review*.

# PISA RANGE

## 1. Landforms

The Pisa Range is the most western of Central Otago's block mountains. It is a distinct geographic unit, separated from other high country by major river valleys and basins. The Clutha Valley is to the north and east, and the Cardrona Valley and Kawarau Gorge provide western and southern boundaries respectively.

Unlike most other Otago block mountains the Pisas present distinct fault escarpments on either side, with a nine kilometre wide, sloping summit plateau between. The eastern scarp is higher and steeper, rising 1500 m above the river terraces of the Clutha Valley. The western scarp, and its Criffel Range northern extension, rises 900-1000 m above the Cardrona Valley. Two catchments drain the plateau; Luggate Creek into the Clutha, and the Roaring Meg into the Kawarau; both becoming deeply incised in their lower reaches but retaining shallow, intricate sub-catchments in their headwaters. Overall, the plateau landscape is characterised by gentle, rounded forms. It lies between 1700 and 1964 m.

Along the eastern summit-lip is a continuous line of glacial cirques with steep headwalls and gentle floors. Drift snow usually persists within the cirques throughout the summer. Tarns are impounded behind the cirque-lips, the largest of which is Lake McKay. An unusual glaciated valley is the Cliff Burn which lacks a steep wall at its head. Instead, the western side only has been gouged out by ice action, resulting in cliffs 180 m high.

Random clusters of shaft and pedestal tors dot the summit crest, providing a stark contrast to their gentle surroundings. It was for good reason that 'Mr. Surveyor' Thomson so named the range in 1857 'as it carries on its summit a huge leaning rock remarkably like the Campanile Pisa'.<sup>(1)</sup>

Ice-shorn features on the lower Luggate faces indicate the upper extent of Pleistocene advances by the Wanaka and Hawea glaciers.

## 2. Vegetation and Wildlife

### 2.1 Vegetation

In the high-alpine zone, extremely dwarfed cushion vegetation colonises the more exposed sites, being less than two



Cirque headwalls along summit-lip; Column Rocks right rear.

centimetres high where wind funnelling is prevalent. Bare erosion pavement occurs locally near the summit and on schist that is more coarsely foliated than the prevailing rock, often supporting only shaggy lichens. Snowbank communities occur in melt seepages on steep leeward slopes. Herbfields, with dominants of *Dracophyllum muscoides*, *Celmisia viscosa*, and blue tussock occupy the greater proportion of the high-alpine, zone down to approximately 1500 m.

Short tussock grasslands cover both upper and lower slopes below the alpine zone, consisting largely of blue, silver and fescue tussock. Lower altitude grasslands, particularly along the warm north and west faces, are increasingly becoming modified by aerial oversowing of exotic pasture species. Remnant patches and individuals of snow tussock indicate that tall tussock previously occupied extensive areas of the range, and have been succeeded by short tussock. Unlike many other Otago rainshadow mountains, there is now a virtual absence of extensive tall tussock grassland on the main Pisas, although the adjacent Queensberry Hill massif still supports such a cover.

A Hall's totara-kanuka association clothes north-eastern faces and narrow stream gorges above Queensberry. This localised shrubland is surrounded by scabweed and 'hard' tussock and is increasingly confined by fires. In the lower Roaring Meg Creek there are small stands of silver beech.



The Pisas are a complete district within the Central Otago Ecological Region.

## 2.2 Wildlife

The South Island pied oystercatcher, black-fronted tern and black-backed gull breed on the top of the range, preferring boggy areas. Low cushion and short tussock areas are used by the banded dotterel for nesting. Kanuka shrublands and dense matagouri provide habitat for grey warbler and silvereye.

Colonising populations of pig are throughout the range, in particular on north and eastern faces. Feral goats are also present, including on the highest tops. Chamois and red deer have been sighted. There are reports of fallow deer, possibly derived from private liberations.

## 3. History and Land Use

### 3.1 Pastoralism

The Pisas first became part of the large Wanaka Station when Robert Wilkin was issued a depasturing licence in 1858. During the 1860's the range was subdivided into several runs. As a result of sustained pressure for closer settlement, the surrounding valley floors were taken from these runs for agricultural subdivision. In conjunction with the accumulative effects of burning, overgrazing, and rabbits, this caused a decline in sheep numbers in the high country, from a peak in the late 1870's.

Declining productivity and low wool prices saw many of the runs go into the hands of their financiers, or be abandoned. This decline continued until the turn of the century when increased wool prices improved prospects.<sup>(2)</sup>

### 3.2 Goldmining

On the crest of the Criffel Range alluvial gold workings were attempted in the 1880's. Working conditions were severe, with a long winter snow cover and summer droughts to contend with. These diggings, along with those on Mt. Buster (Ida Range), were the highest hydraulic sluicings in Otago; in both instances with limited success and considerable hardship for the miners. Small-scale sluicings, hut sites, and water races on the Criffel Range, and in the lower Roaring Meg, remain as evidence of this activity.

Horse pack tracks were established across the southern flanks of the range between Cromwell and the Cardrona goldfield. The benched track via the Roaring Meg Valley remains very distinct.

### 3.3 Hydro-electric Development <sup>(3)</sup>

In 1936 a generating plant was installed at the Roaring Meg-Kawarau confluence. This run-of-the-river scheme was added to in 1947 by an Upper Meg power station. The plant is being refurbished for further increases in generating capacity.

### 3.4 Land Tenure

Today thirteen pastoral leases cover the greater area of the range, plus an expired pastoral occupation licence north of Queensberry Hill. Half the Criffel Range is freehold, up to a height of 1400 m, as is the south-eastern corner of the Pisas to the top of Mt. Michael (1163 m).

Only one scenic reserve currently exists on the range. It is the 5.5 ha Lochar Burn Scenic Reserve which protects vestiges of Hall's totara and kanuka shrublands.

### 3.5 Land Use Capability <sup>(4)</sup>

The eastern summit crest, and from Queensberry Hill to Mt. Allen is Class 8. The remainder of the summit plateau and down to mid slope on the escarpment faces is Class 7. Below approximately 900 m is predominantly Class 6.

The Otago Catchment Board (OCB) sees the need for restricted grazing over all Class 8 and the majority of Class 7 lands, with retirement of critical areas. The primary aim of such restrictions is to improve vegetation condition. National Water and Soil Conservation Authority (NWASCA) policy, to which the catchment board is bound, requires the removal of significant areas of Class 8 and severely eroded Class 7 lands from pastoral leases. (Destocking and Surrender Policy).

The OCB sees potential for increased production on Class 6 land by doubling the area that is oversown and topdressed.

### 3.6 District Scheme Zoning

The range is within Lake and Vincent counties.

West of Roaring Meg Creek to Mt. Pisa, and most of the Luggate Creek catchment, is within **Lake County**. A Rural C (soil and water conservation) zone covers the upper Cliff Burn, with the balance of the range Rural B (pastoral farming). Commercial forestry is a conditional use in both zones, as are tourist facilities in Rural C.<sup>(5)</sup>

Within **Vincent County's Rural 1** zone, there are no specific provisions for protection of landscape values arising from the predominant uses of agriculture and forestry. However 'Council is conscious of the value of the landscape qualities of the countryside as an asset for recreation and tourism'.<sup>(6)</sup>

### 3.7 Protected Natural Areas Survey <sup>(7)</sup>

During the 1984-85 summer, workers from the Department of Lands and Survey inspected the Pisa Ecological District, as part of a broader Protected Natural Areas (PNA) programme within the Central Otago region.

Approximately 10,500 ha was identified as having priority for protection.

The survey team's recommendations are characterised by one large priority area on the range crest, and several small areas on lower flanks.



*Wind-deflated surfaces (Class 8), Pisa Tops. Remarkables rear.*

### 3.7.1 Pisa Tops

This consists of 8560 ha, encompassing about half the summit plateau, and a smaller segment of the eastern cirque complex. The area includes high-alpine cushionfields, and short and tall tussocklands over a wide-ranging altitudinal sequence of vegetation communities.

This large PNA is described as 'of outstanding representative significance', due to the Pisa Range being 'the highest of the fault block mountains characteristic of the Central Otago region, and one of the most distinctive landform and ecological systems of New Zealand.'

### 3.7.2 Other PNAs

Twelve relatively small areas are recommended for protection. Shrubland communities and forest remnants, which have survived as island refuges from a long history of burning, provide the majority of the proposals. Silver beech, Hall's totara, celery and bog pines, kanuka, and native brooms are represented. Tussock grasslands are limited to 630 ha overlooking the upper Cardrona Valley, and a 150 ha stand of dense silver tussock in the lower Kawarau Gorge.

The PNA team concluded that the existing Lochar Burn Scenic Reserve, due to its small size, 'is of little value for long-term conservation of the now rare Hall's totara community.' Accordingly it recommended a 150 ha extension. After an inspection of this area the Protected Areas Scientific Advisory Committee (PASAC) was highly impressed with the proposal, as it represented 'a living vestige of former forests, holding the key to vegetation history in Central Otago.' For unspecified reasons PASAC concluded that public access should be discouraged.<sup>(8)</sup>

### 3.7.3 Conclusions

Several of the priority areas have direct significance for the recreational public.

The **Pisa Tops** covers most of the prime cross country skiing country, with the notable exclusion of Mt. Dottrel and eastern lip-crests in the south.

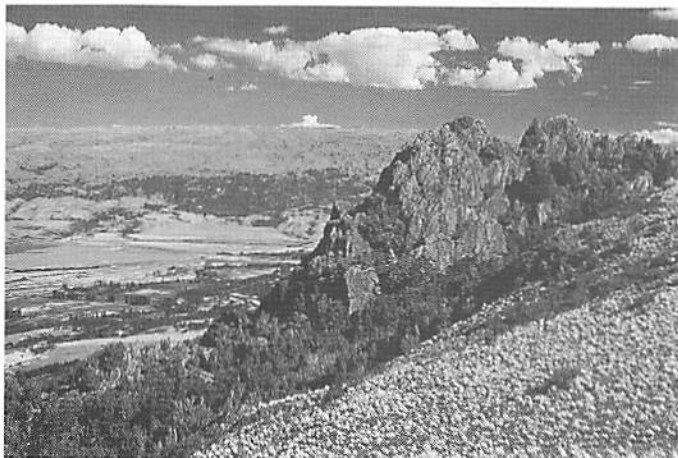
The Criffel Range is totally excluded, due to 'the relatively low naturalness of the entire Criffel land system.' In terms of recreational value however, the Criffel's terrain is almost as good as the Pisa tops for cross country skiing. It also has historical values in its golffield remains.

There are direct implications of PNA status on future pastoral, and commercial recreational activities on the Pisa tops. The greater proportion is Class 8 land and qualifies for removal from pastoral lease under Government's Destocking and Surrender Policy. It is only in the lower Roaring Meg catchment and on the mid altitude eastern escarpment that portions of the PNA coincide with significant pastoral values. In these instances grazing may continue to be acceptable, within stock block limitations. With the possible exception of these areas, the greater balance of the PNA qualifies for scenic reserve status due to its mix of outstanding landscape, biological, and recreational values.

As an area protected for its total landscape values, as much for vegetation conservation, it is crucial that any recreational or other developments are compatible with the area's intrinsic values. In particular, no further roading, or other earth disturbances should be permitted.

Spectacular gorge scenery, and silver beech forest in the lower **Luggate Creek** is worthy of reservation and public access.

Protection by covenant should be sufficient protection for a 20 ha stand of kanuka among steep rock buttresses beside State Highway 6 at **Poison Creek** near Queensberry. It is unusual that such a native shrubland is so readily visible from a main road.



*From Lochar Burn Hall's totara area across Clutha Valley to Bendigo shrublands and Dunstan Mountains.*

The proposed extended **Lochar Burn** Hall's totara area, being situated in striking rock outcrops overlooking the Clutha Valley, also holds public interest. It is located part way up the main vehicle and foot access to Lake McKay and hence cannot be regarded as remote. This area has considerable aesthetic and educational values in addition to scientific value. Public access should be negotiated, with consideration given to extending reserve status to all of the identified priority area.

## 4. Recreational Opportunities

### 4.1 Panoramic Ice and Ski Association (Inc.)

In the early 1960's development was commenced on the north-eastern end of the range, with the intention of opening a skifield in the vicinity of Lake McKay, and of ice skating on the lake as the main attractions. A vehicle track was constructed up a leading ridge above the Lochar Burn and on to the range crest leading to the lake. A large voluntary effort went into the scheme but it petered out due to a lack of finance for metalling the completed formation. PISA (Incorporated) is now disbanded.<sup>(9)</sup>

The site proposed for skiing would not meet present-day skifield requirements. There is lack of vertical height, for other than beginners, and little variety of terrain.

For Lake McKay to be utilised for ice skating would require a major snow clearance operation, due to drift off the surrounding ridges. The upper approaches to the lake are along some 5 km of very wind-exposed crest which is frequently free of skiable snow, in contrast to steep road cuttings lower down which are usually drifted over. There would be difficulties in operating reliable and safe vehicle access under these conditions.

Other potential skifield locations on the range are limited by lengthy access and a lack of vertical height of terrain, and of gradients steep enough for 'downhill skiing'.

## 4.2 Cross Country Skiing

The major recreational potential of the Pisa Range is for cross country skiing.

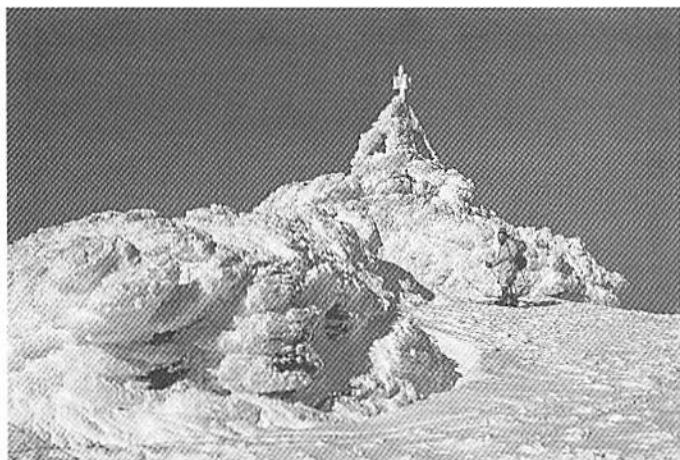
### 4.2.1 Conditions, and Amateur Recreation

Prior to the ready availability of 'nordic' equipment in the mid-1970's, the steeper terrain along the eastern escarpment was visited by ski tourers on alpine touring equipment. Access entails a major climb on foot from the Clutha Valley to establish an overnight camp at Lake McKay. This activity continues.

As is the case on other Otago block mountains, new perceptions of the Pisa's cross country potential have grown under overseas influences, especially from North America and Australia, and from rapidly increasing domestic participation.

The Pisa Range exhibits a full gamut of terrain to suit a wide variety of skier abilities. There are extensive, gently rolling high tops; relatively sheltered, easy valley systems (generally confined); and short, steep valley and cirque walls for the expert.

Unlike many other ranges, the whole back-slope of the Pisas is skiable, without major breaks due to inadequate snow cover or rugged terrain. This allows a large variety of ski tours, from camping bases on the Criffel Range, from within the Roaring Meg headwater tributaries (several), the Lake McKay area, or from Mt. Dottrel-Mitre Rocks to the south.



*Pisa summit.* Photo: Don Greer

Winter snow cover on the plateau appears to be consistently good season-to-season. However, the highest crests and saddles, and the leeward lip of the eastern escarpment have more variable snow cover due to wind exposure. The Pisas provide the largest cross country ski area close to the Southern Lakes district.

However, it appears that although the terrain and snow cover is excellent, the range shares, in common with other Otago block mountains, severe climatic limitations to recreational use. 'White-out' conditions and strong winds occur frequently. With an absence of shelter, and indistinct topography, under poor conditions one can quickly become totally disorientated (*i.e.* lost).

Mountain club experience over many winters indicates that basic safety requires competence in alpine navigation (map and compass use) and snow survival skills, plus the carrying of

overnight survival equipment. The rapidity with which the weather can change, means that no reliance can be placed on travelling light, and locating a hut or known navigational feature if the weather suddenly deteriorates. Self-sufficiency in skills and equipment are essential.

### 4.2.2 Commercial Recreation

Since 1980 commercial operators have promoted the Pisas as a cross country ski destination. In separate ventures, two huts were built, with access by 4WD and ski in one instance, and by either skiplane or helicopter in the other. One of these operations has ceased and the hut removed.

Central in plans for commercial activities on the Pisa Range has been a pastoral lessee, who leases the Roaring Meg headwaters above the Cardrona Valley. His scheme has brought to public attention the issue of public versus private interest in high country pastoral leasehold lands. The rights and effectiveness of Crown agencies acting as landlord, the extent of lessees' legal and perceived rights, and policies for the protection of the public's interest, have all been tested by this case.



*Sunset in the Roaring Meg headwaters.*

At the official level the balancing of interests is dealt with at length by the Land Settlement Board's (LSB) Commercial Recreation Policy. This continues to apply over pastoral lands despite the demise of the Board. A pastoral lessee has no legal