

Crown Pastoral Land Tenure Review

Lease name : HOME HILLS

Lease number : PO 383

Conservation Resources Report - Part 3

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

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

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

April

06

UPPER CLUTHA BRANCH OF FOREST AND BIRD SUBMISSION

-2-

ACCESS;

(6) Walking access to trig F is most important, as the view would be well worth the climb. In this connection it should be recalled, that a request was made at the time of the Blackstone Hill tenure review to secure a walking track to the top of that equally important hill, but this was not forthcoming - it was an opportunity lost - so it should not be allowed to happen again. This walk could start from the gravel pit off Fiddler's Flat road, then up via the farm track. A round trip could be made by going down the ridge to the north west to reach the dam.

(7) A marginal strip should be laid off up the river below the Dam, then around the east side of the lake to its head. There should also be legal 4WD access on the track above this marginal strip.

(8) On the map supplied at the early warning meeting a legal road was shown running east from the Manherika river road to another running below the water race. The track around the race could and should become the legal road, and the south most track shown on the map from this to the main road become the legal access. Whichever way it is done it is important that there be legal 4WD access to the race, and around it.

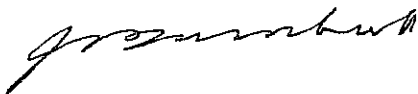
Attached are photos to illustrate the points we wish to draw your attention to.

- (1) A view north from trig F showing the spur, or ridge, down which the walking access could be made available.
- (2) Looking north west from spot height.948 showing type of ground cover. Tall tussock on shady side.
- (3) Two views of vegetation above the Mt Ida water race taken between Hut creek and Ten creek.

Map showing freehold and land we suggest should retained by Crown.

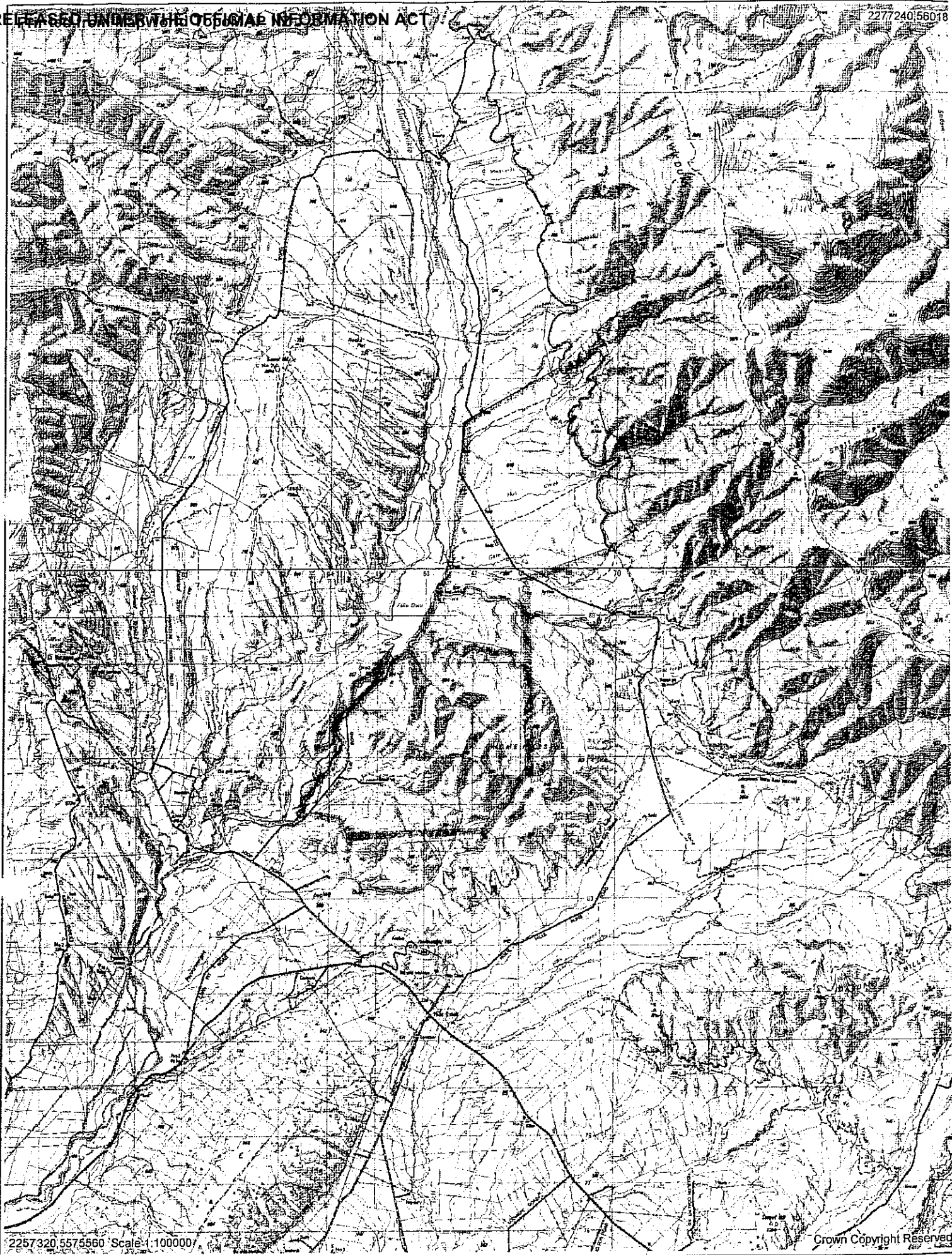
We thank you for the opportunity to have input into this proposal..

Yours faithfully



John L Turnbull

For Upper Clutha Branch



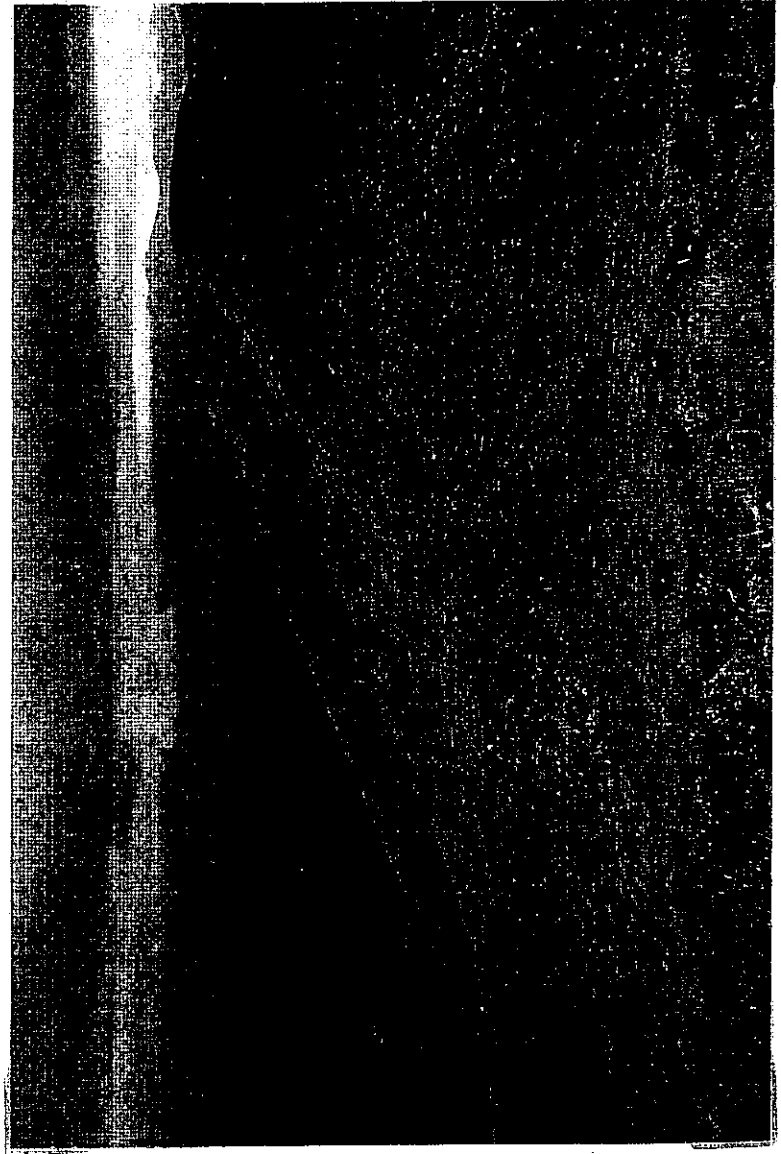
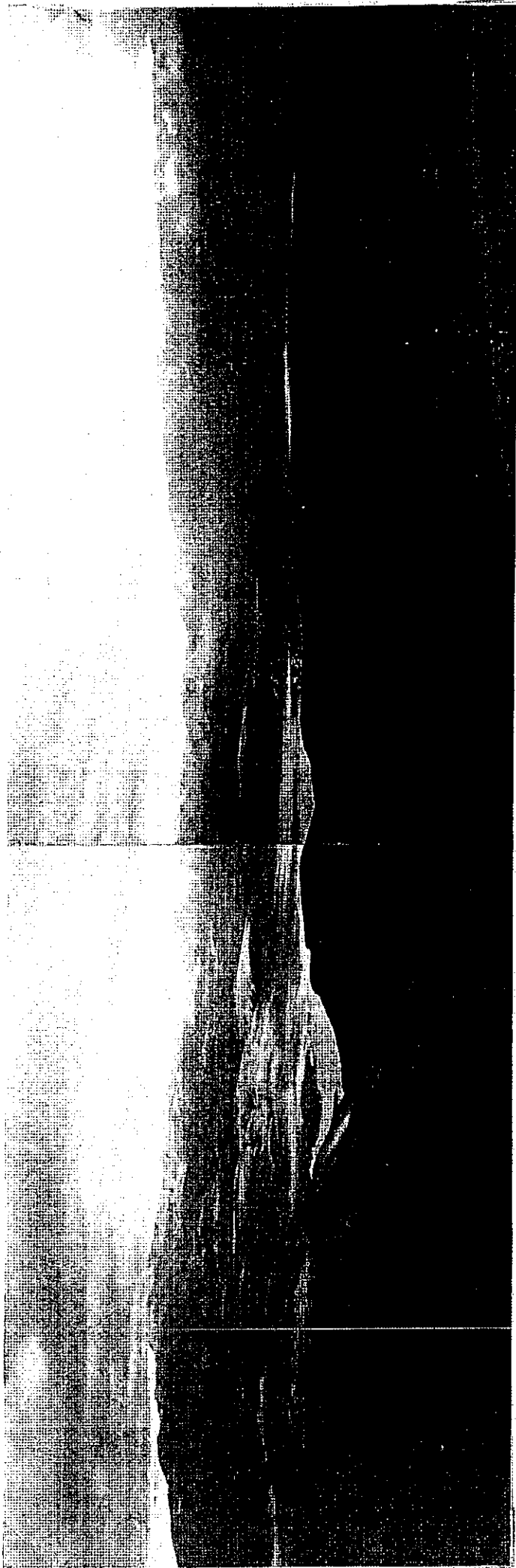
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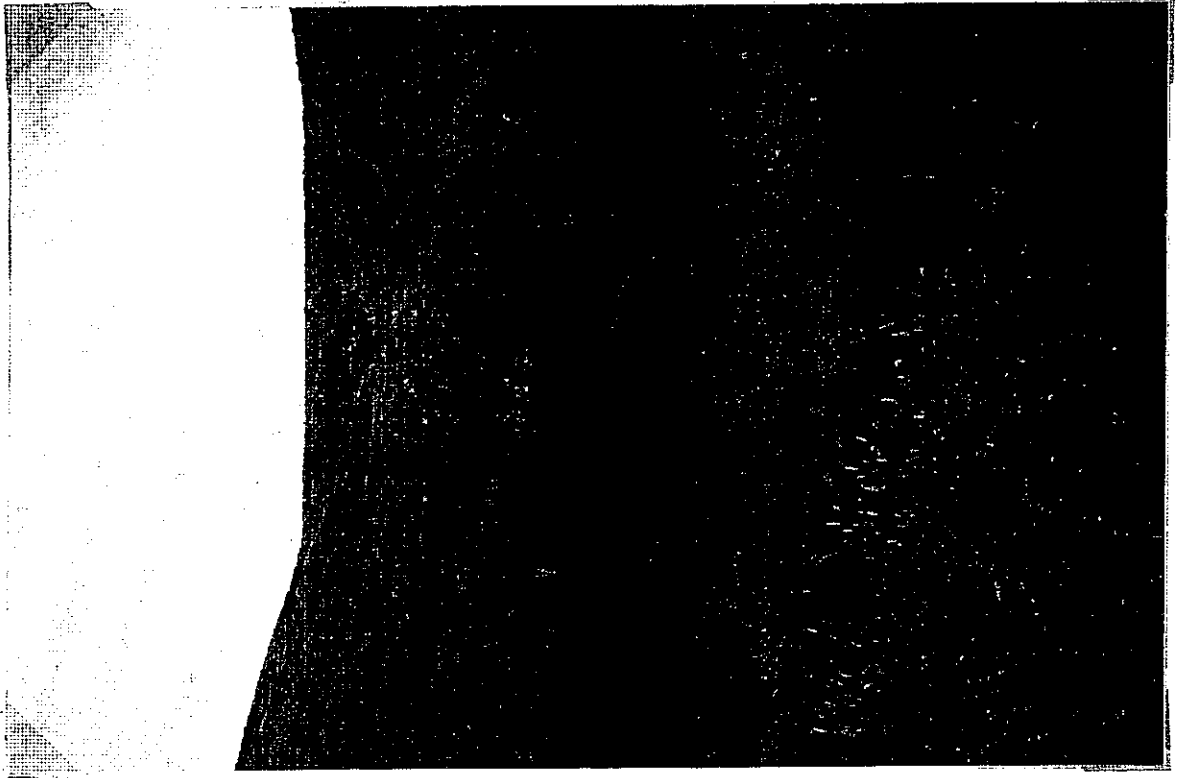
HOME HILLS - TENURE REVIEW

Freehold

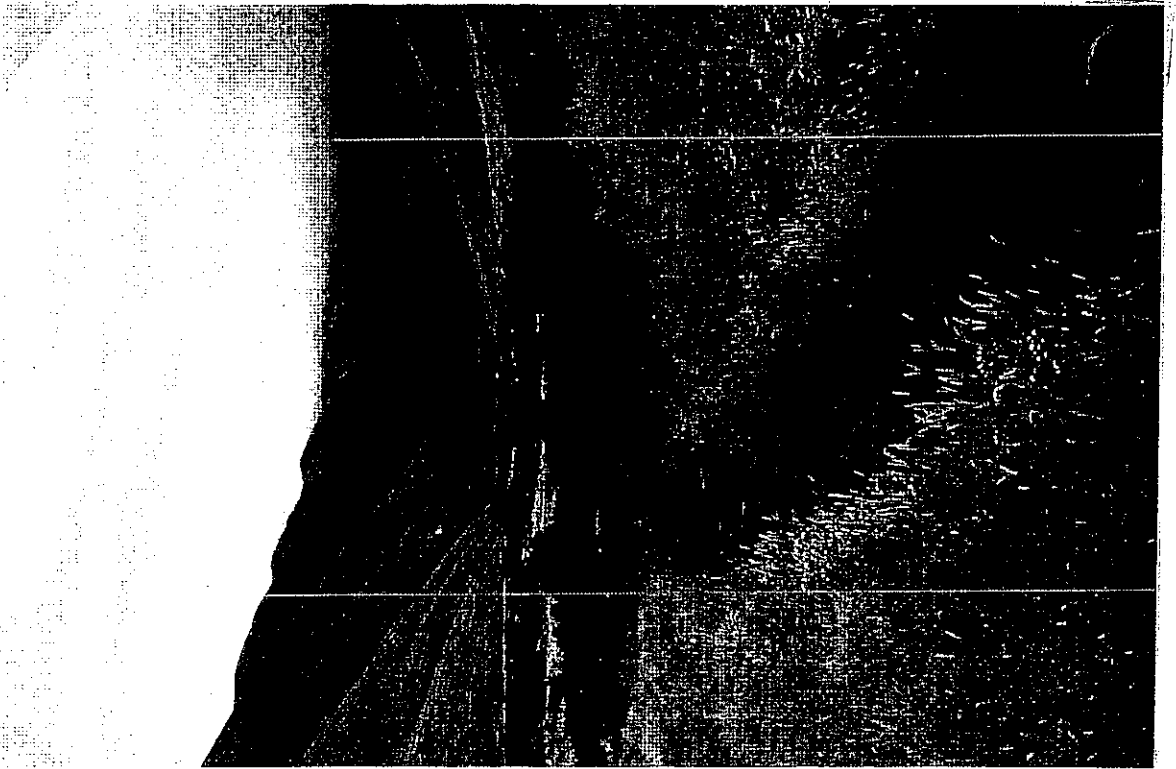
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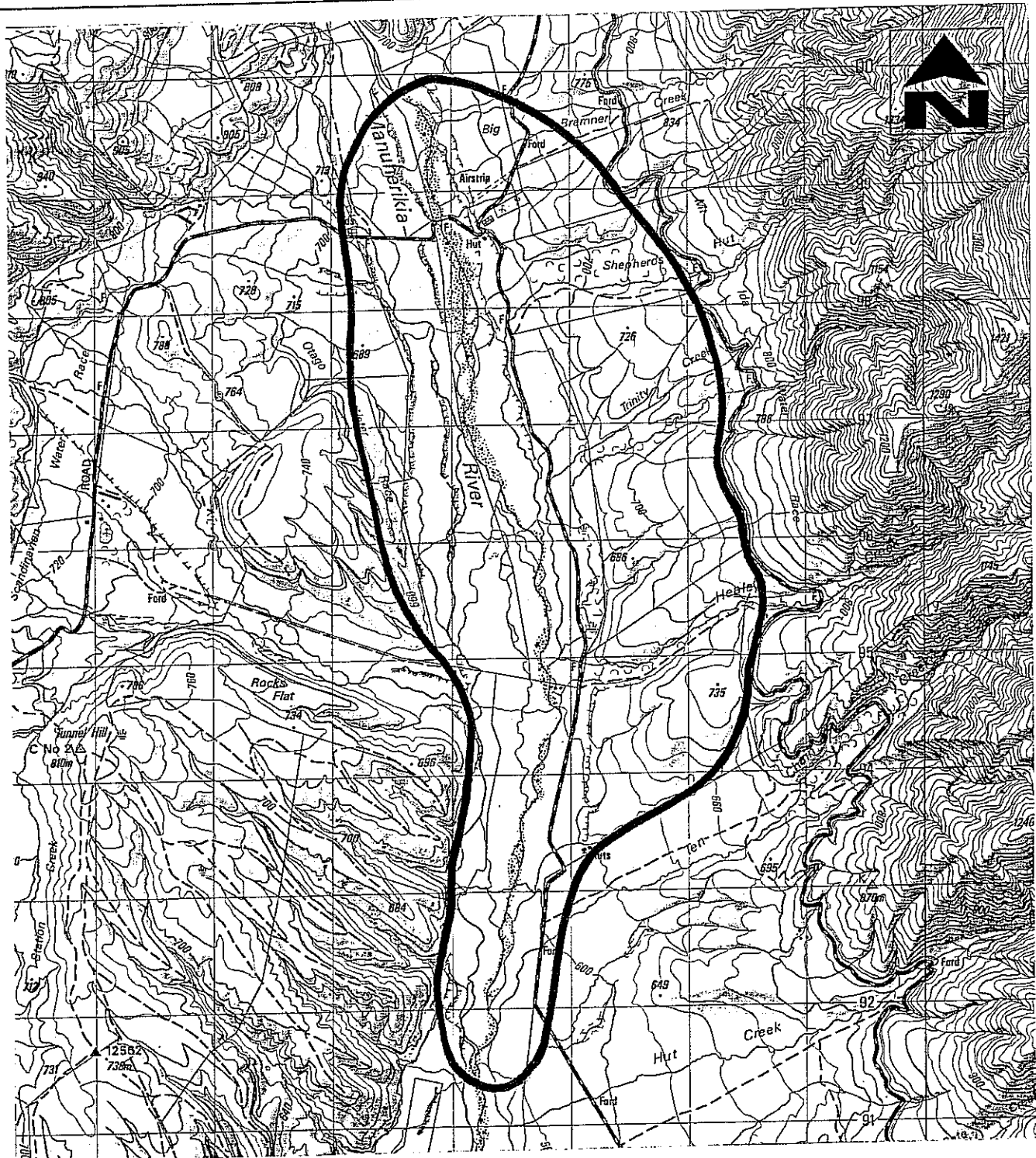
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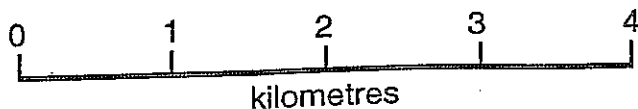
PNAP REPORT - AOI 1

MANIOTOTO ECOLOGICAL DISTRICT
MAP 3/1 : AOI 1

AOI 1
UPPER MANUHERIKIA



GRID REFERENCE : INFO MAP 260 H40 670 960
AREA : 2040 hectares
ALTITUDE : 508m - 700m



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Map Licence OT 1991/5

SECTION FIVE

AOI 1 UPPER MANUHERIKIA VALLEY

Reference Chapman (1985)

Introduction The vegetation of this area has been documented in some detail by Chapman (1985) as the botanical component of the investigations by the Liquid Fuels Trust Board into the lignite deposits of the upper Manuherikia Valley. Chapman concluded that the vegetation of this area was of high botanical value because it represents one of the best remaining examples of low-altitude red tussock grassland and associated mosaic of vegetation types on river terrace landforms. These valley-floor grasslands, shrublands and wetlands are of further significance as part of an altitudinal sequence of indigenous vegetation from the Manuherika Valley floor to the summits of the Hawkdun and St Bathans Ranges. Chapman also predicted that under present management practices, red tussock grassland plus associated fescue tussock and silver tussock grasslands would be depleted in extent and eventually replaced by exotic pasture. This would indeed appear to be the case, nearly ten years after that botanical survey. Nevertheless, examples of most of the vegetation types identified in the 1985 report can still be found, albeit with a greater exotic component in the flora, and are included in the AOI.

Landform The area lies at approximately 600 - 750 m bounded to the west by the foothills of the St Bathans Range and to the east by the fault scarp of the Hawkdun Range. The valley floor is a down-faulted basin filled with Manuherikia Group sediments, which are a mixture of fine grain muds and gravels. The sediments erode to produce the hummocky topography found on the western edge of the basin. Maori Bottom gravels in places overlie the sediments forming low hills. The semi-permeable properties of these gravels lead to runoff from hill slopes into flushes. The fans and terraces are composed of coarse greywacke gravels and are highly permeable. The fans, as a relatively young landform still in the process of formation contrast with the older terraces whose different levels represent different periods of deposition.

Climate The average yearly rainfall is 600 mm over most of the upper Manuherikia basin. Winds are predominantly northwesterly and southerly. Snow can lie for up to two weeks over most of the area during winter and frosts are severe from May until late August.

Soils Cass soils predominate on the greywacke hillslopes and fans. These are of moderate to low fertility and are vulnerable to wind and sheet erosion. Tasman soils are associated with river terraces, braided river channels and swampy ground, and are of medium to low fertility.

Flora A full list of plant species recorded in the upper Manuherikia basin is included in Chapman (1985).

In summary, the following numbers of plant species were recorded:

	Native	Naturalised	Total
Trees, shrubs and lianes	28	5	33
Herbaceous dicotyledons	80	45	125
Monocotyledonous plants	36	22	58
Ferns and fern allies	6		6
	150	72	222

Despite some extensive modification of the indigenous vegetation the number of native species far exceeds the number of exotic ones, although many of the exotic grasses and herbs do occur with a very high frequency. Two noteworthy native species which occur here are: the low shrub *Pimelea traversii* which is found in narrow leaved snow tussock (*Chionochloa rigida*) and red tussock (*Chionochloa rubra*) grassland and is near the southern limit of its distribution; *Coprosma intertexta* is a species of limited range in Otago and Canterbury and is present in shrublands within the AOL.

Vegetation Types The distribution of vegetation types is largely due to soil moisture conditions which are in turn determined by aspect and underlying geology. When the environment is controlled by a strong, localised influence, such as in a cushion bog or flush, certain species will constantly occur together and there will be well defined vegetation boundaries. However, more extensive vegetation types such as grasslands and shrublands do not have distinct boundaries but tend to merge into each other. The actual species composition at any one point will reflect the habitat conditions along a shallow gradient in controlling environmental factors and the way in which different combinations of plant species have adjusted to land use.

1. Matagouri shrubland

Matagouri (*Discaria toumatou*) 1.5-2.5 metres tall makes up approximately 60% of the vegetation cover of the shrub layer. Associated shrubby species include sweet brier (*Rosa rubiginosa*), porcupine scrub (*Melicytus alpinus*) and *Coprosma intertexta*. The lianes *Muehlenbeckia complexa* and *Rubus* sp. scramble over and among the shrubs. The shrubs overtop a sparse understorey (5-30cm) of mainly pasture grass, plume grass (*Dichelachne crinita*) and exotic herbs especially white clover, sorrel and woolly mullein.

Matagouri shrubland is most extensive on stream sides where it can form a fringe up to 10m wide. It also occurs in gully bottoms and around the base of hill slopes where there is ample water supply, and on steep hill slopes where matagouri is able to tap soil moisture below the reach of grass roots. The gully-bottom stands are distinct from the more widespread stream-side shrublands in having taller matagouri and associated shrubs over a species-rich understorey.

2. *Chionochloa rubra* tussockland

a) Red tussock on terraces and hill slopes

Red tussock 1m - 1.3m high forms an open canopy through which matagouri and fescue tussock (c. 70-90cm) are scattered with occasional shrubs of *Carmichaelia petriei* and *Coprosma intertexta*. A sward layer (c. 40cm) includes species such as *Poa cita* and the exotic grasses *Holcus lanatus* and *Poa pratensis*. Dwarf shrubs and both naturalised and weedy herbs (c. 15cm tall) form a species-rich ground layer. *Leucopogon fraseri* and *Coprosma petriei*, *Bulbinella angustifolia* and *Ranunculus foliosus*, and *Hieracium pilosella* are all characteristic species. Patches of *Pernettya nana* are scattered within red tussock grassland on these sites, associated with local rises in the water table. Smaller patches of *Euphrasia zelandica* and the clubmoss *Lycopodium scariosum* occur on terraces.

b) Red tussock fringing water seeps

Red tussock up to 2m tall forms a dense canopy with up to 90% cover. Exotic species such as *Holcus lanatus* and *Juncus effusus* occupy the inter-tussock spaces with a scattering of low herbs eg white clover (*Trifolium repens*) and *Ranunculus foliosus*.

c) Red tussock on periodically waterlogged sites

Red tussock (c. 90cm tall) forms an open canopy interspersed with shrubs such as *Olearia bullata* up to 2m high. An intermediate vegetation tier (20cm-60cm) of varying density is formed by *Juncus effusus*, *Schoenus pauciflorus* and *Carex coriacea*. Low moisture-loving herbs such as *Montia fontana* and *Hydrocotyle heteromeria* are also present.

Within the whole valley basin, red tussock occurs on the deep soils of higher terraces and gentle south or southeast facing hill slopes of the Maori Bottom hills, and on the lower slopes of the St Bathans and Hawkdun Ranges. It is (or was) the dominant vegetation cover of the poorly draining hummocky ground of the valley floor and in places still forms a dense fringe to water seeps flowing down hill slopes and through the hummocky ground. Red tussock merges into narrow-leaved snow tussock (*Chionochoa rigida*) grassland above about 900m, where some hybridisation is evident, and into pasture on lower altitude, freely draining soils.

3. Fescue tussock grassland

Fescue tussock (*Festuca novae-zelandiae*) 50 - 60cm high forms an open canopy in which silver tussock (*Poa cita*) may be co-dominant. Matagouri is scattered among the short tussocks with occasional native broom (*Carmichaelia* sp.), red tussock and snow tussock. Browntop (*Agrostis capillaris*) is the most abundant species in a sward layer 20-30cm tall, with sweet vernal (*Anthoxanthum odoratum*), *Lachnagrostis* sp. and blue tussock (*Poa colensoi*) sometimes present. *Carex breviculmis* and *Luzula rufa* are present at low frequency. There is a sparse ground cover with up to 30% bare soil or small stones. Exotic herbs especially *Cerastium fontanum*, *Hypochoeris radicata* and white clover dominate the ground cover with a sparser distribution of native species such as *Raoulia subsericea* and *Scleranthus uniflorus*.

Fescue tussock grassland is characteristic of low terraces and low to mid-altitude hill slopes, especially lower altitude sites which have been burnt or heavily grazed. Fescue tussock gradually gives way to red tussock on less disturbed terraces and moister sites and to snow tussock at higher altitudes. Much of the original cover has been converted to pasture but a substantial amount of fescue tussock remains on the terraces within the AOI. *Hieracium pilosella* is abundant on burnt or heavily grazed ground and *Bulbinella angustifolia* on damper sites.

4. Silver tussock grassland

Silver tussock (c. 50cm tall) forms a canopy of variable cover with several low or grazed shrubs including matagouri and native broom, and fescue tussock. Narrow leaved snow tussock, red tussock, sweet brier and *Olearia bullata* are scattered emergents. Blue tussock (c. 30-40cm tall) is a major component of the sward layer. Pasture grasses including browntop, sweet vernal and Yorkshire fog also make significant contributions. A dense, species rich ground cover is dominated by exotic species including white clover, Californian thistle (*Cirsium arvense*) and *Hieracium pilosella*. Silver tussock grassland occurs on low- to mid-altitude sites between 750 and 900m. It predominates on gentle, free draining hill slopes and some areas of low lying flat ground. Fire and grazing have led to the exclusion of silver tussock from some sites to be replaced by fescue tussock. Much of this vegetation type has been converted to pasture by oversowing and topdressing.

5. Riverbed vegetation

Riverbed vegetation occurs on periodically-flooded sections of river channel made up of stones and gravel with various proportions of sand and silt. This unstable substrate can only be colonised by a limited number of native species; characteristically prostrate creeping herbs and cushion plants, plus a variety of adventive herbs and grasses. Vegetation height ranges from 1-2m of brier and matagouri down to prostrate herbs and cushion plants. The vegetation type is best developed on the gravel braids of the Manuherikia River. It also occurs on gravel sites associated with tributaries flowing from the Hawkdun and St Bathans Ranges.

Native mat-forming herbs and cushion plants such as *Raoulia bookeri*, *R. tenuicaulis*, *Muehlenbeckia axillaris*, *Epilobium microphyllum* and *E. brunnescens* predominate on the most unstable and flood-prone sections of riverbed, commonly lining the waters edge. The mats and cushions are in turn colonised by small herbs such as *Anisotome aromatica* and *Wahlenbergia albomarginata*. *Scleranthus* spp. and *Colobanthus* spp. are scattered among the mats and cushions. Naturalised annual or biennial weedy species with a wide ecological tolerance are scattered across riverbed sites, their particular distribution being determined by chance. Drier sites which usually escape flooding are colonised by species associated with tussock grasslands such as *Geranium sessiliflorum*, *Bulbinella angustifolia* and brier.

6. Cushion bog vegetation

This term describes patches of vegetation in which comb sedge (*Oreobolus pectinatus*), dwarf rushes, grasses and creeping herbs combine to form more than 80% of the cover. The structure of a cushion bog varies according to its particular species composition but the low, single-tiered structure contrasts sharply with the surrounding grassland or shrubland. Grasses, rushes and sedges (30cm - 1m) are scattered across the bog surface and become dense towards the edge. The most abundant species within the comb sedge matrix are *Rytidosperma pumilum*, *Gnaphalium* spp., and *Isolepis aucklandica*. Some cushion bogs at the southern end of the area are dominated by a new species of *Galium* ('tarn').

Cushion bogs are restricted to areas in which there is surface water seep. These are most common on hillsides in gully heads, on the edge of high terraces where streams flow down from adjoining steep hill slopes, on gravel fans adjoining drainage channels and in the hollows on hummocky terrain underlain by Maori Bottom gravels. Comb sedge tends to predominate on bogs where the surface water is slow-moving and poorly aerated. Dwarf rushes and herbs predominate where there is a more rapid water flow and consequently more available air and nutrients.

7. Flush vegetation

The term flush vegetation is used to describe an assemblage of plants in which a combination of *Carex coriacea*, jointed rush (*Juncus articulatus*), *Ranunculus glabrifolius*, *Mimulus moschatatus* and *Myosotis laxa* ssp. *caespitosa* are characteristic. No single species occurs in every example of flush vegetation; the species composition is variable and determined by particular site conditions. Flush vegetation occurs where there is moving surface water and a silty substrate. Gully heads on hillsides, natural seepage channels and the edge of ponds are characteristic habitats and are scattered throughout the AOI.

The species composition of a flush varies according to the rate of water flow, depth of substrate and nutrient availability. Jointed rush and *Mimulus moschatius* tend to predominate on the wettest sites where there is relatively fast flowing water. Associated aquatic plants confined to the main water channel include *Myriophyllum propinquum* and *Potamogeton cheesemanii*. Toward the outside edge of a flush red tussock in association with rushes and sedges such as *Carex gaudichaudiana*, *C. sinclairii* and *Elaeocharis acuta* dominate.

8. Ponds and water races

Shallow (<30cm) and deep (>30cm) ponds are associated with seepage channels which meander along the base of hill slopes or low river terraces. They usually occur within a few metres of a stream or main river channel. Shallow ponds usually have a muddy substrate which is colonised by stands of spiked rush (*Elaeocharis acuta*). This gives way to jointed rush where there is some water flow and to cutty grass on the drier margins. *Mimulus moschatius*, *Ranunculus glabrifolius*, *Eplilobium ciliatum*, *Mentha spicata*, *Nasturtium officinale*, *Hydrocotyle* sp and *Glyceria fluitans* are all associated with the edge of stands of rushes and are usually scattered amongst or beneath them. Pasture grasses and sort rush (*Juncus effusus*) reach to the pond edge.

Deep ponds have a stony substrate and clear water. They are colonised by exotic plants such as pondweed (*Potamogeton cheesemanii*), *Myriophyllum propinquum* and *Myosotis laxa* ssp. *caespitosa*. Chickweed and *Montia fontana* float on the pond surface. The aquatic vegetation of water races comprises *Ranunculus fluitans*, water milfoil and pondweed.

Fauna

Wrybill regularly visit the upper Manuherikia River and black stilt have been reported there also (McEwen 1987). Upland bully (*Gobiomorphus breviceps*) live in the river and tributary streams.

Discussion

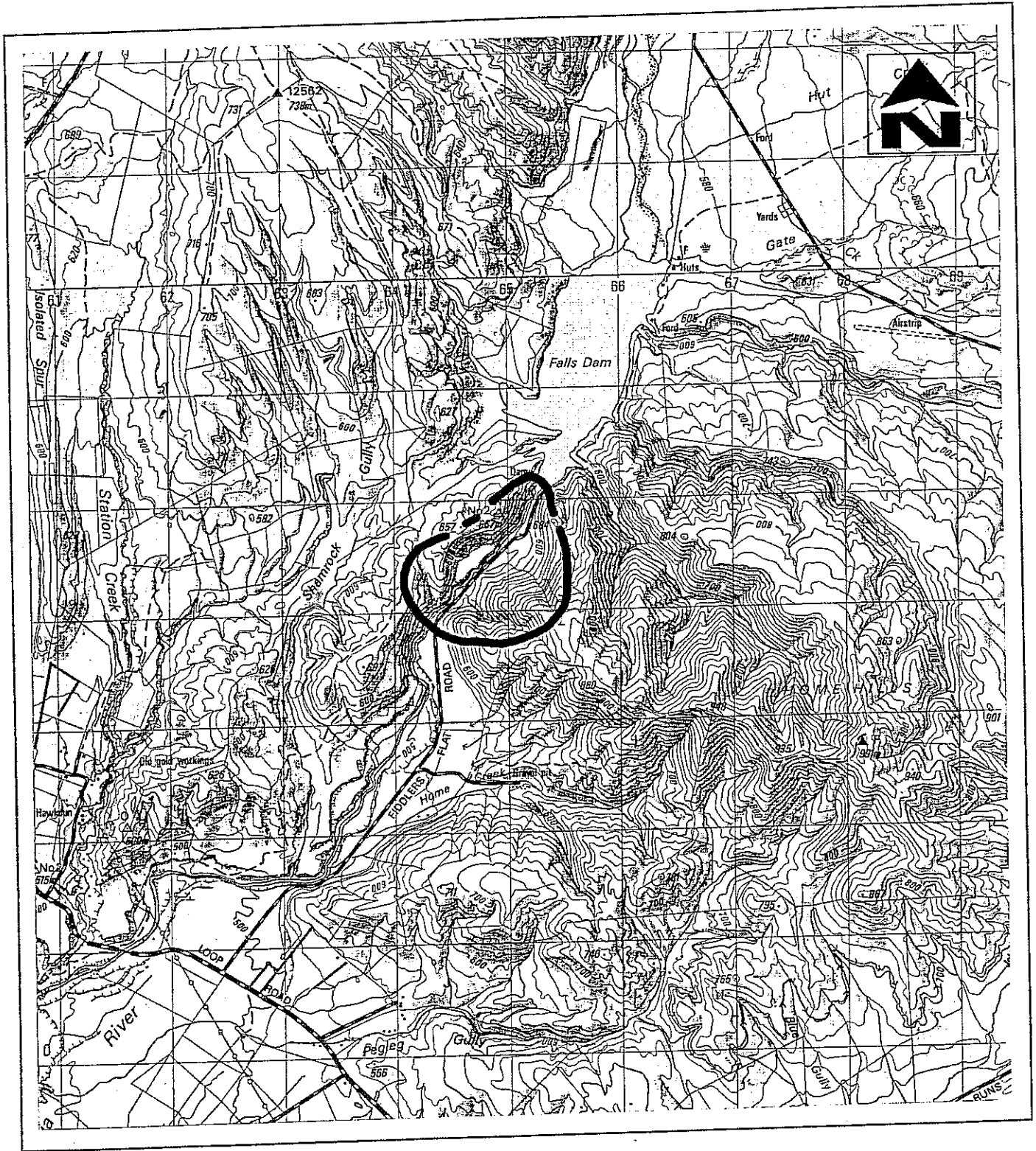
The tussock grassland of the upper Manuherikia basin has been modified by over a hundred years of burning and grazing. More recently, oversowing with pasture grasses and clovers and fertiliser topdressing in association with burning and grazing has favoured the spread of exotic plant species at the expense of native vegetation. Nevertheless, the area retains a substantial amount of indigenous vegetation and flora over a wide area of montane valley floor. It represents the best example of red tussock and fescue tussock grassland and associated wetlands, tussocklands and shrublands to be found on such a landform (low river terraces and hills) in both the Central Otago and neighbouring Waitaki Ecological Regions. The semi-braided river system of the Manuherikia River is also of great ecological value. Protection is essential to ensure the survival and recovery of these regionally threatened plant communities.

The vegetation of the valley floor is contiguous with an altitudinal sequence of less modified indigenous vegetation types extending to the tops of the Hawkdun and St Bathans Ranges. The upper Manuherikia basin shares some of its vegetation types with adjoining areas of the St Bathans and Hawkdun Ecological Districts (Waitaki Ecological Region). A detailed ecological re-assessment of the whole area is essential to fully document existing values in anticipation of future tenure changes and ongoing pastoral modifications. Ideally, a protected area should be established that is continuous with and complementary to recently acquired conservation land on the Hawkdun Range thereby securing a sequence from high-alpine mountain tops to montane valley floor. A reserve here, containing examples of what are now regionally rare red tussock and fescue tussock grasslands, wetlands and shrublands would be of immense conservation, scientific and scenic value.

PNAP REPORT - AOI 2

MANIOTOTO ECOLOGICAL DISTRICT
MAP 3/2 : AOI 2

AOI 2
FALLS DAM



GRID REFERENCE : INFO MAP 260 H41 650 875
AREA : 150 hectares
ALTITUDE : 600m - 820M



AOI 2 FALLS DAM GORGE

Reference Chapman (1985)

Landform Stable boulder slopes, coarse talus, loose scree and rock bluffs on gully sides of between 30 and 50 degrees slope. Gorge carved by Manuherikia River immediately below Falls Dam. Elevated alluvial terraces on the east side of the river are remnants of an earlier phase of river deposition. Three stream gully tributaries (including Johnston Creek) flow from Home Hills into Falls Dam within the AOI.

Vegetation and Flora The dry river terraces support a matagouri-brier / *Festuca novae-zelandiae* shrub-tussockland over a mainly exotic understorey of pasture grasses and clovers. Various scabweeds and other native species grow amongst the exotics: *Carmichaelia enysii*, *C. monroi*, *Pimelea oreophila*, *P. prostrata*, *P. sericeo-villosa*, *Stackhousia minima*. In seasonally damp places a short species of summergreen *Carex muelleri* forms dense stands on the river terraces.

The river gorge and tributary stream gulleys, plus parts of the dam shoreline hold a diverse mixed shrubland. A mixture of matagouri, brier and *Coprosma propinqua* (1.5 to 3m high) forms most of the shrub cover but other shrub species are also common including: *Carmichaelia petriei*, *Olearia odorata*, *Aristotelia fruticosa*, *Melicytus alpinus*, *Coprosma parviflora* and *Coprosma intertexta*. The latter is a regionally rare, but locally quite common shrub species. Lianes of *Muehlenbeckia complexa* and *Rubus* sp. trail over the shrubs. Understorey vegetation varies in composition and density according to the substrate. Bracken (*Pteridium esculentum*) is dominant on boulder piles while *Blechnum penna-marina* is scattered amongst coarse talus. Tussock grasses (*Festuca novae-zelandiae*, *Poa cita* and occasional *Chionochloa rigida*) are present on the rocky outcrops of steep slopes while pasture grasses form cover on more gentle ground. Shorter grasses and herbs present are *Elymus solandri*, *Deyeuxia avenoides*, *Poa colensoi*, *Raoulia australis*, *R. parkii*, *Acaena buchananii*, *A. caestiglauca*, *Leucopogon fraseri*, *Crassula tetramera*, *Vittadinia australis*, *Brachyglottis bellidioides*, *Epilobium alsinoides*, *E. melanocaulon* and *E. nummularifolia*.

The west side of the river gorge has a population of the threatened plant *Lepidium kawarau*. A single plant of the rare native nettle *Urtica aspera* was found at the base of a scree slope.

Senecio quadridentata grows on screes and exposed rock outcrops. Other rock outcrop species present are *Helichrysum selago*, *Luzula rabdina*, *Anisotome brevistylus* and *Rytidosperma coronim*.

Streambeds at the base of tributary gulleys hold *Juncus gregiflorus*, *Carex sinclairii* and *C. buchananii*.

More gently sloping sites near the lake edge hold a mosaic of fescue tussock grassland and native heath, the latter including *Coprosma perpusilla*, *Pernettya nana*, *Leucopogon fraseri*, *Galium aparine*, *Carex breviculmis*, *Deyeuxia avenoides*, *Raoulia subsericea*, *Geranium sessiliflorum*, *Scleranthus uniflorus*, *Helichrysum filicaule* and *Colobanthus* sp.

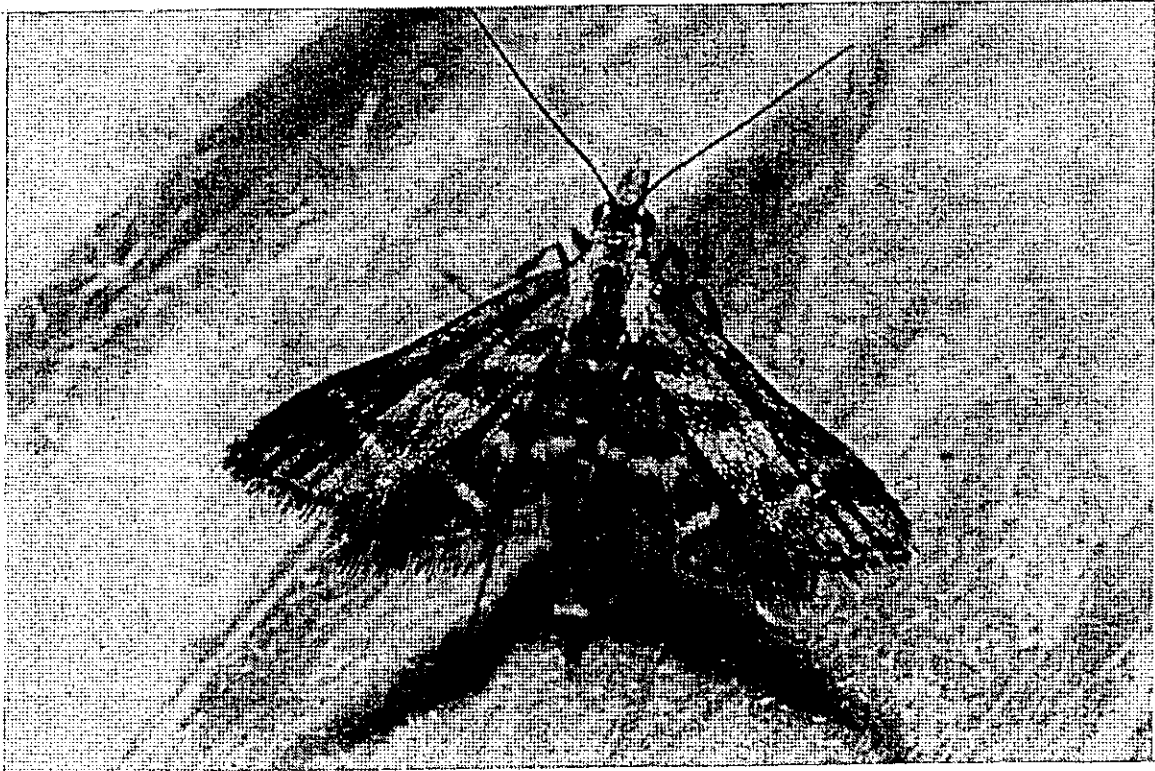
Falls Dam itself holds an impressive aquatic flora which is revealed during low lake levels.

Fauna

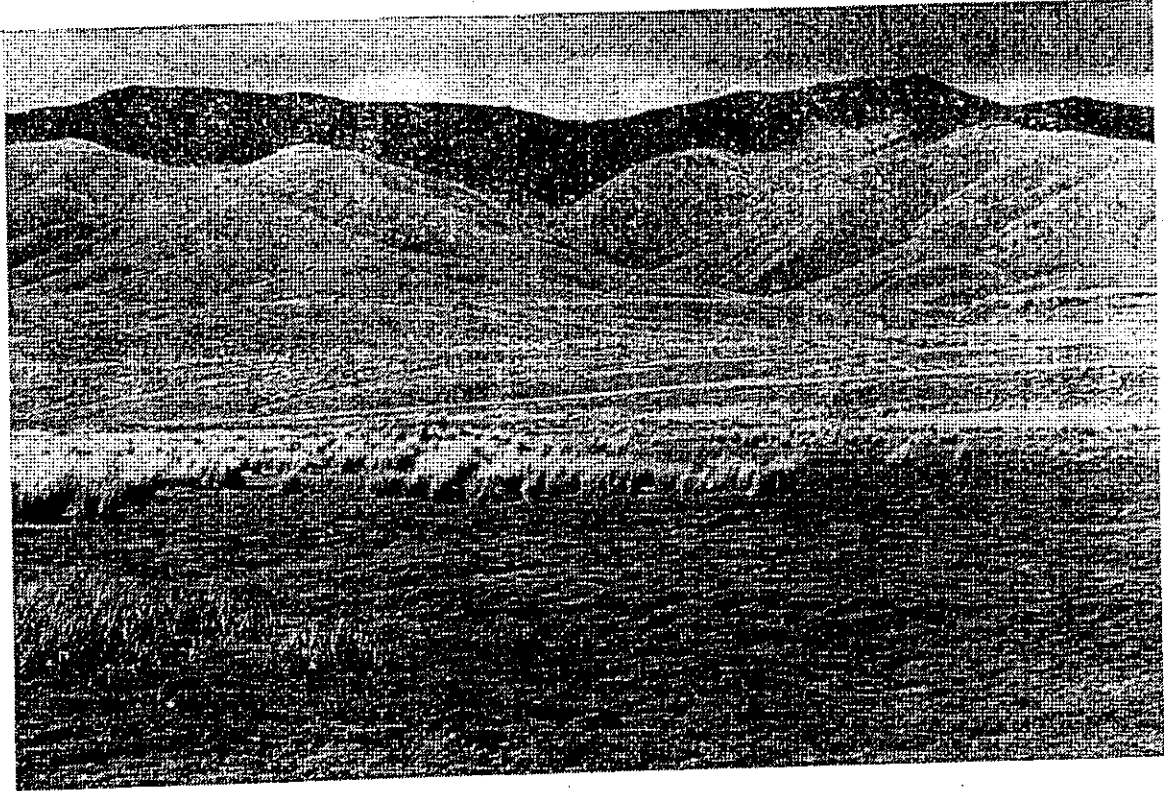
Green skinks (*Leiopisma chloronoton*) are present in the gorge below Falls Dam. Common skinks and common geckos are present throughout the area (Whitaker 1986).

Discussion

This AOI contains some of the most diverse and extensive shrublands in the Maniototo Ecological District. Within it are populations of the threatened plant *Lepidium kawarau*. The relatively rare shrub *Coprosma intertexta* is common in the AOI. Tussockland, heath, scree, rock outcrop, wetland and aquatic vegetation add to the botanical diversity. The shrublands, river and lake are habitat for a range of native and introduced birds.



*Typical of open short tussock areas is the diurnal moth *Diasemia grammalis**



Seasonally wet cushionfield at the base of the Hawkdun Range

APPENDIX 6

PHOTOS