

TIMARU DISTRICT COUNCIL
14 JUL 2009
RECEIVED

TIMARU DISTRICT

SIGNIFICANT NATURAL AREAS SURVEY

HASSELMAN PROPERTY



Report prepared for the Timaru District Council by Mike Harding

TIMARU DISTRICT SIGNIFICANT NATURAL AREAS SURVEY

PROPERTY REPORT

PROPERTY DETAILS:

Owner:Charles and Nan Hasselman
Lessee:.....Andrew Steven
Valuation Reference:24810/053.00
Address:Kerr Road, Cave
Location:.....Southeast end of the Brothers Range, north of Cave.
Ecological District:Fairlie Ecological District.
TDC Land Type:.....Soft Rock Hills and Downs.
Land Environment:N3 (eastern South Island undulating plains and hills).

ECOLOGICAL CONTEXT:

The property covers gently-sloping to moderately-steep rolling hill country at the southeast end of the Brothers Range. It includes the upper catchment of Tengawai Flat Creek and slopes on the north side of the Tengawai River near Cave. A notable feature of the property is the prominent limestone bluffs on south- and west-facing scarps. The property lies in the eastern corner of Fairlie Ecological District, near the boundary of the Geraldine and Fairlie ecological districts.

It is likely that the original vegetation of this area was predominantly mixed podocarp-hardwood forest with areas of scrub and shrubland. Forest in the Fairlie Ecological District is now largely confined to small remnants in gullies. Otherwise, vegetation of the ecological district has been substantially modified, though relatively extensive areas of scrub and shrubland are present on the steeper slopes and upper gullies of the Brothers Range. Areas of exposed limestone on the property are more typical of the adjoining Geraldine and Waimate ecological districts. The original vegetation of these rockland areas was probably similar to that present today, though perhaps with a greater diversity of indigenous species. Areas of wetland present on the property were probably originally forested, though the existing wetland vegetation is typical of that present in the ecological district today.

The indigenous fauna would have been significantly more numerous and diverse, with a greater range of birds, lizards and invertebrates than are presently found in the area. The property lies close to the known range of the South Canterbury population of long-tailed bat and provides suitable roosting and/or breeding habitat for bats. This species is regarded as nationally-endangered.

Indigenous vegetation on the property comprises areas of regenerating forest, scattered shrubland, rockland plant communities on limestone bluffs, and a relatively extensive sedge-dominated wetland. Stock-water ponds and associated wetland vegetation provide useful habitat for birds such as pukeko and pied stilt.

SIGNIFICANT AREAS ON THE PROPERTY:

The property was surveyed as part of the District-wide survey of Significant Natural Areas during August, September and November 2005. Nearly all parts of the property were visited and assessed. Ten areas, totalling approximately 25 hectares, are regarded as significant when assessed against the District Plan criteria. These areas are listed in the table below. Note that the assessment of limestone plant communities on the property is constrained by the unclear identity and status of some plant species. Further taxonomic or survey work may alter the significance assessments of areas supporting these species.

Area No.	Area Name	Central grid reference	Aprox. size (ha)	Vegetation/habitat type
454	Tengawai Flat Creek north	J38: 476-552	0.96	hardwood forest with totara
455a	Tengawai Flat Creek	J38: 475-550	0.58	sedgeland (wetland)
455b	Tengawai Flat Creek	J38: 470-551	0.63	sedgeland (wetland)
455c	Tengawai Flat Creek	J38: 469-557	0.41	sedgeland (wetland)
455d	Tengawai Flat Creek limestone	J38: 471-552	4.65	rockland
455e	Tengawai Flat Creek limestone	J38: 472-551	5.84	shrubland
455f	Tengawai Flat Creek south bluff	J38: 473-549	5.10	rockland and shrubland
456a	Upper Tengawai Flat Creek	J38: 464-558	5.20	hardwood forest with totara
456b	Upper Tengawai Creek	J38: 463-555	0.37	hardwood forest with totara
469a	Tengawai River bluffs	J38: 472-541	1.19	rockland and shrubland

Areas of indigenous vegetation and/or habitat on the property that are identified as Significant Natural Areas (above) are illustrated on the attached aerial photograph and described in greater detail on the Area Inspection Forms that form part of this report. These areas meet the ecological criteria in the Timaru District Plan (criteria i-vi, pages B18-B19) and are considered to be sustainable in the long term (criterion vii, page B19). Areas are subject to confirmation by Council after regarding the matters listed under Final Considerations (pages B19-B20).

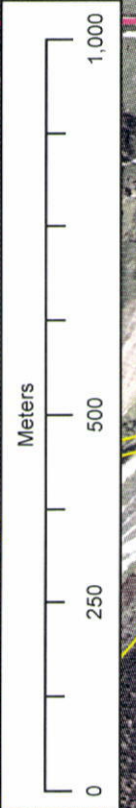
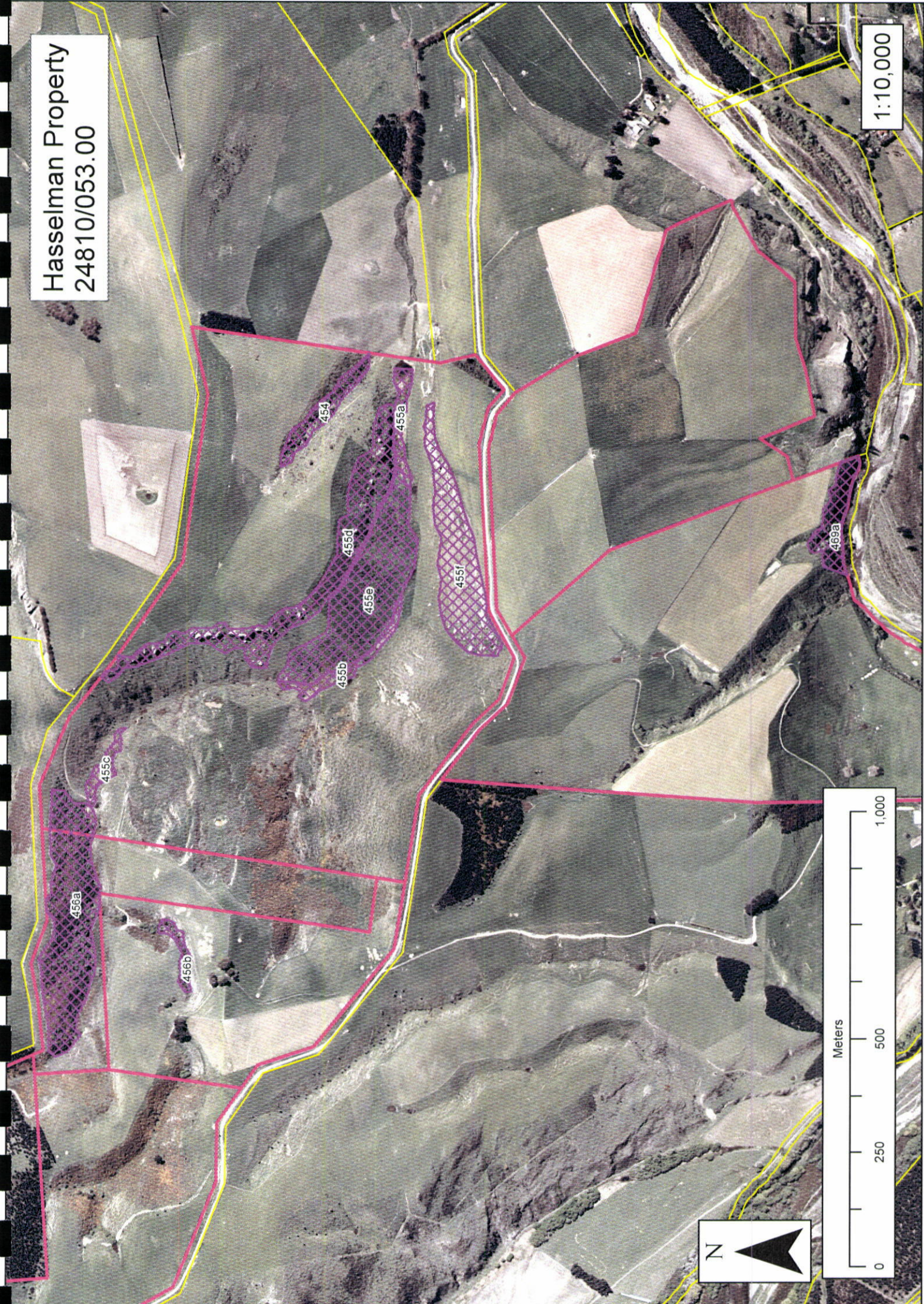
The implication of an area being listed as a Significant Natural Area (SNA) is that consent is required from Council for clearance of indigenous vegetation or habitat by any means (including burning and spraying with herbicides) or over-planting. To assist with the protection and management of any SNA, landowners are eligible to apply to Council for financial assistance. Any questions regarding the protection, management and use of SNAs should be directed to the District Planner.

OTHER AREAS INSPECTED ON THE PROPERTY:

Other areas of indigenous vegetation and habitat on the property were inspected but are not regarded as significant when assessed against the criteria on pages B18-B20 of the Timaru District Plan. Failure of an area to meet the significance criteria does not necessarily mean that an area is not important for nature conservation or the protection of indigenous biodiversity; it simply means that the area (as assessed at this time) does not meet the criteria in the Timaru District Plan. Some of these areas have considerable potential value and, if left alone, may eventually become significant. One notable area is the narrow remnants of wetland vegetation linking Areas 455a, b and c along Tengawai Flat Creek. This wetland area would soon become significant if regeneration or restoration of wetland vegetation occurred.

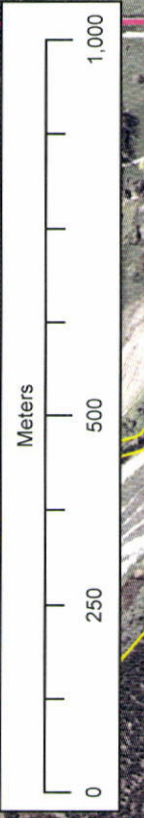
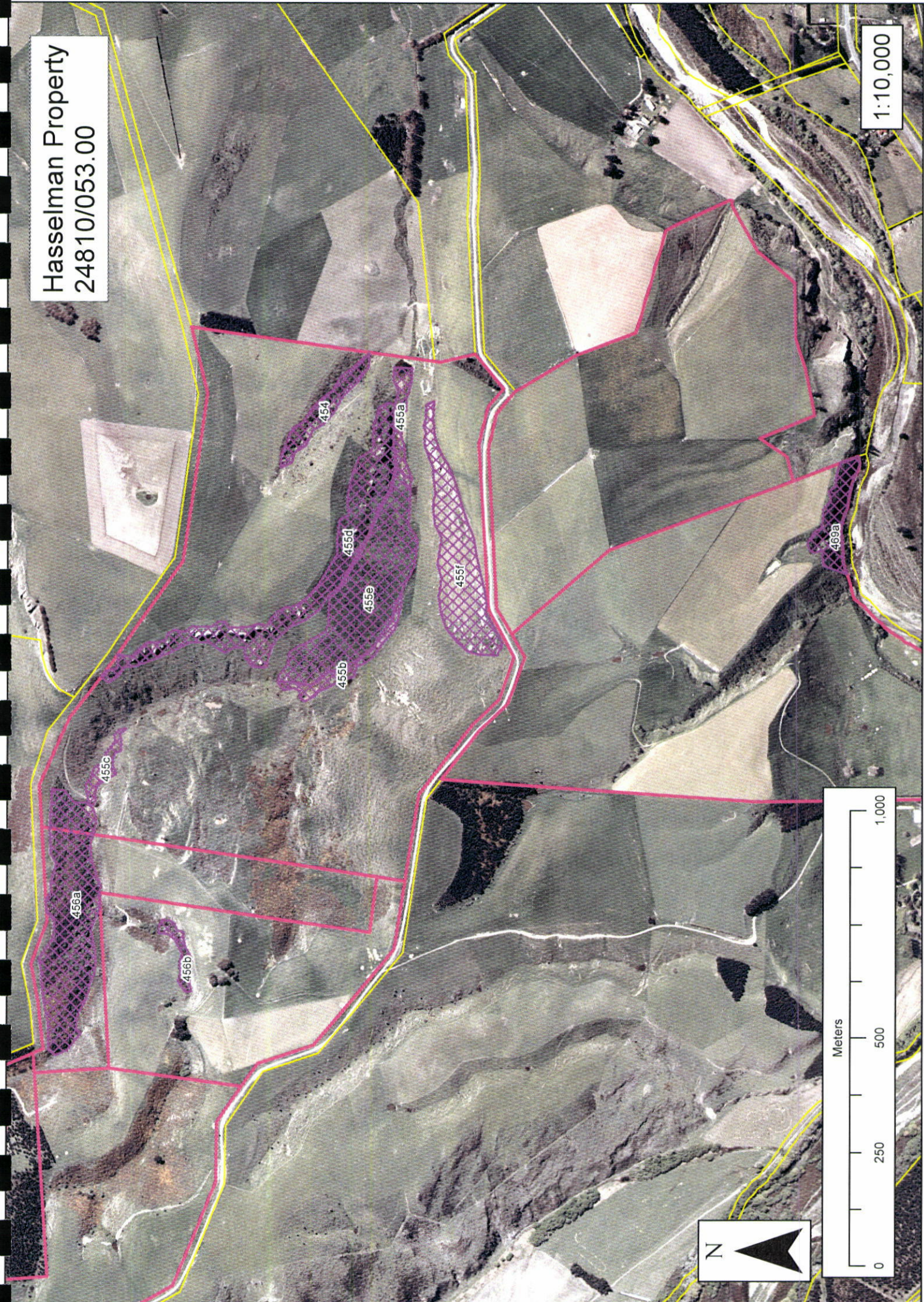
Hasselman Property
24810/053.00

1:10,000



Hasselman Property
24810/053.00

1:10,000



Scientific names of species cited by common name on the Area Inspection Forms

Common Name	Scientific name
(* = naturalised species)	
bidibid	<i>Acaena</i> sp.
blackberry*.....	<i>Rubus fruticosus</i>
broadleaf.....	<i>Griselinia littoralis</i>
broom*	<i>Cytisus scoparius</i>
bush lawyer	<i>Rubus cissoides</i>
bush lily	<i>Astelia</i> sp.
cabbage tree/ti rakau.....	<i>Cordyline australis</i>
cherry plum*.....	<i>Prunus cerasifera</i>
crack willow*.....	<i>Salix fragilis</i>
elderberry*.....	<i>Sambucus nigra</i>
fivefinger.....	<i>Pseudopanax arboreus</i>
fuchsia.....	<i>Fuchsia excorticata</i>
gooseberry*.....	<i>Ribes uva-crispa</i>
gorse*.....	<i>Ulex europaeus</i>
hard fern.....	<i>Paesia scaberula</i>
hemlock*.....	<i>Conium maculatum</i>
hen and chickens fern.....	<i>Asplenium bulbiferum</i>
horehound*.....	<i>Marrubium vulgare</i>
kanuka.....	<i>Kunzea ericoides</i>
koromiko.....	<i>Hebe salicifolia</i>
kowhai.....	<i>Sophora microphylla</i>
lancewood.....	<i>Pseudopanax crassifolius</i>
lawyer.....	<i>Rubus schmidelioides</i>
mahoe (whiteywood).....	<i>Melicytus ramiflorus</i>
male fern*.....	<i>Dryopteris filix-mas</i>
mapou.....	<i>Myrsine australis</i>
marbleleaf (putaputaweta).....	<i>Carpodetus serratus</i>
matagouri.....	<i>Discaria toumatou</i>
matipo.....	<i>Pittosporum tenuifolium</i>
mistletoe.....	<i>Ileostylis micranthus</i>
narrow-leaved lacebark.....	<i>Hoheria angustifolia</i>
native broom.....	<i>Carmichaelia</i> aff. <i>australis</i>
native jasmine.....	<i>Parsonsia</i> sp.
necklace fern.....	<i>Asplenium flabellifolium</i>
old man's beard*.....	<i>Clematis vitalba</i>
pate.....	<i>Schefflera digitata</i>
pohuehue.....	<i>Muehlenbeckia australis</i>
porcupine shrub.....	<i>Melicytus alpinus</i>
prickly shield fern.....	<i>Polystichum vestitum</i>
raupo.....	<i>Typha orientalis</i>
scrambling fuchsia.....	<i>Fuchsia perscandens</i>
silver tussock.....	<i>Poa cita</i>
soft rush*.....	<i>Juncus effusus</i>
stonecrop*.....	<i>Sedum acre</i>
sweet brier*.....	<i>Rosa rubiginosa</i>
toatoa.....	<i>Haloragis erecta</i>
totara.....	<i>Podocarpus totara</i>
weeping mapou.....	<i>Myrsine divaricata</i>
wineberry.....	<i>Aristotelia serrata</i>

TIMARU DISTRICT SNA SURVEY

AREA 454

Area Number: 454	Area Name: Tengawai Flat Creek north	Date: 18 August 2005
Property: Hasselman	Surveyors: Mike Harding and Kathryn Hill	
Weather Conditions: fine and mild		Time Spent at Area: ½ hour

Location (central grid reference): J38: 476-552	Nearest Locality: Cave	
Ecological District: Fairlie	Approximate size of Area: 1 ha	Altitude: 180 to 220 m
General description of Area: A small side-gully of Tengawai Flat Creek at the eastern end of the Brothers Range.		

General description of plant communities and habitats: A small patch of hardwood forest surrounded by scattered scrub.
--

Detailed vegetation description: The dominant canopy species in this small forest remnant are lancewood, broadleaf and pohuehue. Other canopy species present are matipo, cabbage tree, mahoe, <i>Olearia aviceniifolia</i> and a single young totara tree. One broadleaf tree has a trunk diameter (at breast height) of 115 cm. The forest understorey is relatively open. Species present are lawyer, <i>Coprosma crassifolia</i> , <i>C. propinqua</i> , <i>Olearia aviceniifolia</i> and elderberry. Ground cover species are mahoe, <i>Nertera</i> sp., <i>Ranunculus</i> sp., prickly shield fern, <i>Polystichum richardii</i> , male fern, necklace fern, <i>Asplenium hookerianum</i> , <i>A. lyallii</i> , <i>A. richardii</i> , <i>Pellaea rotundifolia</i> , <i>Blechnum chambersii</i> and <i>B. fluviatile</i> . A single shrub of <i>Olearia bullata</i> is present at the forest margin. Scattered scrub adjoining the forest is dominated by matagouri, <i>Coprosma propinqua</i> , pohuehue and gorse. Three large kowhai trees are present on open slopes above the forest.
--

Birds observed: Grey warbler and bellbird.
--

Notable flora, fauna or habitats: The presence of totara, a large broadleaf tree and large lancewood trees are notable. Also notable are the presence of <i>Asplenium lyallii</i> along the stream (where the limestone substrate is exposed) and the shrub daisy <i>Olearia bullata</i> at the forest margin. The large kowhai trees adjacent to the forest are notable.

General condition of Area: The forest canopy is in reasonable condition, though the understorey is grazed and open. Shrubland on the adjoining slopes has been sprayed.

Notable plant and animal pests: Elderberry is the main plant pest observed within the forest. Gorse is (or was) present on adjoining slopes.
--

Boundaries: (buffering, fencing, adjoining plant communities/habitat etc.): The patch of forest is fenced from adjoining cultivated paddocks within a larger paddock. It is buffered to some extent by the adjoining scrub, though the area of forest is very small. The forest is partly linked (or could be potentially linked) to a larger area of limestone bluff and shrubland (Area 455) by open slopes that presently support scattered shrubs and large kowhai trees.

Present management and management issues: Protection of the forest understorey from grazing and the removal of elderberry are the most important management issues. Linking of the forest with other areas of indigenous vegetation associated with the nearby limestone bluffs would be a very worthwhile long-term objective.

Property Owner Comment:

ASSESSMENT (against District Plan criteria):		
Primary Criteria	Rank	Notes
Representativeness	M	A depleted example of indigenous vegetation typical of the ecological district.
Rarity	M	A locally rare species <i>Asplenium lyallii</i> is present.
Diversity and pattern	M	Species and habitat diversity is substantially reduced.
Distinctiveness/special features	L/M	The proximity of the Area to other areas of indigenous vegetation and habitat is the most distinctive feature.
Other Criteria		
Size/shape	M	The forest patch is small but has a relatively good shape and is buffered by indigenous shrubland.
Connectivity	M	The area is connected to Area 455d by scattered shrubland. It is part of a network of fauna habitat in the area.
Long-term Sustainability	M	The area is modified, though would persist with conservation management.
SNA (yes/no):	YES	
Final Consideration (of other matters, Section D, page B-19):		
This Area has been informally protected by the landowners. Management of the forest remnant to better protect its values and eventually increase its size would be very worthwhile.		

Discussion:
 By itself, the Area only just meets the District Plan criteria for a Significant Natural Area. Its small size and modified condition limit its value. However, as the Area is close to other more extensive areas of indigenous vegetation and habitat (Area 455) and is somewhat buffered by its location and by surrounding indigenous shrubland, it is listed here as an SNA.

TIMARU DISTRICT SNA SURVEY

Area 455a, Area 455b and Area 455c

Area Number: 455a, b and c	Area Name: Tengawai Flat Creek	Date: 21 September 2005
Property: Hasselman	Surveyors: Mike Harding, Philip Grove, Kathryn Hill	
Weather Conditions: fine with a cool wind		Time Spent at Area: 2½ hours

Location (central grid reference): J38: 470-551	Nearest Locality: Cave	
Ecological District: Fairlie	Approximate size of Area: 1.6 ha	Altitude: 170 to 220 m
General description of Area: The mid-reaches of Tengawai Flat Creek, from the property boundary in the east to the area of indigenous forest in the upper valley (Area 456a).		

General description of plant communities and habitats:
Sedgeland and reedland in a series of wetlands along the bed of Tengawai Flat Creek, separated by pasture and narrower remnants of wetland vegetation along the creek.

Detailed vegetation description:
Three main areas of indigenous wetland vegetation are present (Area 455a, Area 455b and Area 455c).
Area 455a is dominated by *Carex secta*, with patches of dense raupo in an area of standing water (pond) at its down-valley (eastern) end. Shrubs of *Coprosma propinqua* are scattered through the wetland. Crack willow trees are present at one location and several small elderberry trees are present near the wetland margin. Soft rush and *Carex coriacea* are present along the wetland margins. *Blechnum minus* is occasionally present. The inter-sedge vegetation is otherwise dominated by pasture grasses or water.
Area 455b is dominated by *Carex secta* with *Carex coriacea* and soft rush present at the margins. Crack willow and cabbage trees are present. *Coprosma propinqua* shrubs are scattered through the wetland. Otherwise the inter-sedge vegetation is dominated by pasture grasses.
Area 455c is similar to Area 455b, though crack willow is absent. Areas of *Carex secta* in this wetland have recently died, apparently from herbicide spray, though some individual sedges appear to be recovering.

Wetland Record Sheet	Location	Survey Form No.
sedgeland/reedland	Area 455a	Wetland 455a
sedgeland	Area 455b and Area 455c	Wetland 455b

Birds observed:
Paradise shelduck and welcome swallow were observed throughout the valley. Several pukeko and two pied stilts were observed at the pond in Area 455a. Two mallard ducks and one white-faced heron were observed between Area 455b and Area 455c.

Notable flora, fauna or habitats:
The extent of wetland vegetation and the habitat it and the intervening creek provide are notable features. Its location adjacent to a prominent limestone scarp and downstream from an area of indigenous forest adds value to the Area.

General condition of Area:
The parts of wetland within the three defined areas are in relatively good condition. Each area comprises stands of *Carex secta* and or raupo that are wide and dense enough to limit the effects of grazing animals. The inter-sedge vegetation is dominated by introduced species (except where there is standing or flowing water). However, this is typical of most lowland wetlands in the area. The narrower stands of wetland vegetation along the creek between the defined areas are more severely affected by domestic stock. They are in much poorer condition (and therefore not included within the defined areas) but are not beyond recovery.

Notable plant and animal pests:
Crack willow and elderberry are the most important plant pests present. Gorse also poses a threat. Pasture grasses are the dominant ground cover, though little could be done to control these species. Domestic stock, notably deer and cattle, pose the greatest threat to the ecological integrity of the wetland.

Boundaries: (buffering, fencing, adjoining plant communities/habitat etc.):
The defined areas of wetland are long and narrow, as they are confined to the wetter areas along the creek. The lower part of the wetland (Area 455a) has been enhanced in some respects by the creation of a pond. This has maintained and probably increased the size of this area of wetland vegetation. It has also made it wetter than it would otherwise be, enabling raupo to dominate parts of the Area. Fences are present along and across the areas of wetland, though few have the potential to provide effective protection of the wetland from grazing animals. Area 455a and Area 455b adjoin sparse indigenous shrubland and pasture on steep slopes below the limestone bluffs, on the northern side of the valley (Area 455e). Area 455c adjoins an area of indigenous forest (Area 456a) at its up-valley (western) boundary.

Present management and management issues:

The areas of wetland, and the intervening strips of wetland vegetation along the creek, are grazed by domestic stock. Preventing stock access to the main areas of wetland vegetation is the most important management issue. Linking of the three larger areas of wetland vegetation by the restoration of wetland vegetation along the creek would be a very worthwhile long-term objective. Crack willow and elderberry trees should be removed.

Property Owner Comment:**ASSESSMENT (against District Plan criteria):**

Primary Criteria	Rank	Notes
Representativeness	M/H	A good example of wetland vegetation that is typical of the ecological district.
Rarity	L/M	No rare or threatened species were observed, though the Area may provide suitable habitat for such species.
Diversity and pattern	M/H	Species diversity is considerably reduced from that originally present in the area. However, the location of the wetland adjacent to limestone bluffs/slopes and indigenous forest contributes to ecological diversity of the area.
Distinctiveness/special features	M	The wetland makes a significant contribution to ecological sequences in the area, even though it and the surrounding plant communities are modified.
Other Criteria		
Size/shape	M	The wetland is of moderate size, though has a poor shape. It is buffered to some extent by its location on the valley floor.
Connectivity	M	The wetland forms a viable, though interrupted, ecological link between other areas of vegetation and habitat.
Long-term Sustainability	L/M	The Area is modified and not resilient. Its values will decline without appropriate protection and management. If the Area was fenced from grazing it would rank M or M/H, depending on the size of the area protected.
SNA (yes/no):	YES	

Final Consideration (of other matters, Section D, page B-19):

The main areas of wetland vegetation have been defined for the purposes of this assessment. Ideally the whole wetland system, including the more modified areas along the creek, should be considered. However, these intervening areas do not strictly meet the definition of indigenous vegetation that has been adopted for the Significant Natural Areas Assessment Procedure.

Discussion:

Collectively, the three areas of wetland assessed easily meet the District Plan criteria for a Significant Natural Area. The extent of the wetland habitat, the location of the wetland adjacent to other areas of indigenous vegetation and habitat, and its ecological functioning as part of a more extensive (though modified) wetland system are important features.

TIMARU DISTRICT SNA SURVEY

AREA 455a

Wetland name:	Date: 21 September 2005
Property: Hasselman	Grid Ref: J38: 475-551
Altitude: 170-180 m	No. of plots sampled:
Location: Tengawai Flat Creek, Cave	Approximate size (ha): 0.58

Classification: I System	IA Subsystem	II Wetland Class	IIA Wetland Form
Palustrine	Permanent	Swamp	Channel

Surveyors: Mike Harding, Philip Grove, Kathryn Hill

Indicator	Indicator components	Specify and Comment	Score 0-5 ¹	Mean score
Change in hydrological integrity	Impact of manmade structures	dam affecting >25%	3	3.5
	Water table depth	raised by dam		
	Dryland plant invasion	some pasture at margins	4	
Change in physico-chemical parameters	Fire damage	no evidence	5	4
	Degree of sedimentation/erosion	localised: stock trampling	4	
	Nutrient levels	likely to be affected by fertiliser and cattle	3	
	von Post index	n/a		
Change in ecosystem intactness	Loss in area of original wetland	likely to be some increase	5	4.5
	Connectivity barriers	dams, pasture development and grazing	4	
Change in browsing, predation and harvesting regimes	Damage by domestic or feral animals	not fenced, margins affected, centre unaffected	3	3.3
	Introduced predator impacts on wildlife	not known	2	
	Harvesting levels	none apparent	5	
Change in dominance of native plants	Introduced plant canopy cover	small patch of crack willow	4	2.5
	Introduced plant understorey cover		1	
Total wetland condition index /25				17.8

Main vegetation types: *Carex secta* sedgeland; patch of mixed raupo-*C. secta* sedgeland; small stand of crack willow; scattered shrubs.

Native fauna: pied stilt, paradise shelduck, pukeko, welcome swallow, fantail, harrier.

Other comments: within range of long-tailed bat.

Pressure	Rating ²	Specify and Comment
Modifications to catchment hydrology	4	catchment deforested
Water quality within the catchment	2	most of catchment grazed (cattle, sheep and deer)
Animal access	4	fences impede access in places
Key undesirable species	2	15/40 = 37.5%
% catchment in introduced vegetation	4	
Other pressures	1	small exotic tree plantation in head of valley
Total wetland pressure index /30	17	

¹ Assign degree of modification thus: 5=v. low/ none, 4=low, 3=medium, 2=high, 1=v. high, 0=extreme

² Assign pressure scores as follows: 5=very high, 4=high, 3=medium, 2=low, 1=very low, 0=none

TIMARU DISTRICT SNA SURVEY

AREA 455b

Wetland name:	Date: 21 September 2005
Property: Hasselman	GPS/Grid Ref: J38: 469-552
Altitude: 180-200 m	No. of plots sampled:
Location: Tengawai Flat Creek, Cave	Approximate size (ha): 0.63

Classification: I System	IA Subsystem	II Wetland Class	IIA Wetland Form
Palustrine	Permanent	Swamp	Channel

Surveyors: Mike Harding, Philip Grove, Kathryn Hill

Indicator	Indicator components	Specify and Comment	Score 0-5 ¹	Mean score
Change in hydrological integrity	Impact of manmade structures	small dams and fences	2	3.3
	Water table depth	altered locally	4	
	Dryland plant invasion	some pasture at margins	4	
Change in physico-chemical parameters	Fire damage		5	4
	Degree of sedimentation/erosion	stock trampling	4	
	Nutrient levels	dung and fertiliser	3	
	von Post index	n/a		
Change in ecosystem intactness	Loss in area of original wetland		5	4.5
	Connectivity barriers	stock damage	4	
Change in browsing, predation and harvesting regimes	Damage by domestic or feral animals	domestic deer present	2	3
	Introduced predator impacts on wildlife		2	
	Harvesting levels		5	
Change in dominance of native plants	Introduced plant canopy cover	crack willow present	4	2.5
	Introduced plant understorey cover		1	
Total wetland condition index /25				17.3

Main vegetation types: *Carex secta* sedge/land, scattered *Coprosma propinqua* shrubs and cabbage trees.

Native fauna: welcome swallow, white-faced heron

Other comments:

Pressure	Rating ²	Specify and Comment
Modifications to catchment hydrology	4	
Water quality within the catchment	2	
Animal access	5	
Key undesirable species	2	
% catchment in introduced vegetation	4	
Other pressures	1	potential for spray drift
Total wetland pressure index /30	18	

Source: Clarkson *et al*, Handbook for monitoring wetland condition, Ministry for the Environment, August 2002.

¹ Assign degree of modification thus: 5=v. low/ none, 4=low, 3=medium, 2=high, 1=v. high, 0=extreme

² Assign pressure scores as follows: 5=very high, 4=high, 3=medium, 2=low, 1=very low, 0=none

Present management and management issues:

Important management issues are the control of elderberry and gorse. The type and intensity of grazing is also an important management issue, as the herbfield communities on the grassy slopes are vulnerable to trampling and grazing.

Property Owner Comment:**ASSESSMENT of AREA 455d (against District Plan criteria):**

Primary Criteria	Rank	Notes
Representativeness	H	A good example of the rockland communities originally present in the ecological district.
Rarity	M/H	One threatened species (<i>Gingidia enysii</i>) and a number of locally rare species are present. Potential habitat for long-tailed bat.
Diversity and pattern	M	Species diversity is probably slightly reduced from that originally present.
Distinctiveness/special features	M/H	Predominantly intact habitats that are part of a sequence of vegetation and habitat (rockland, shrubland and wetland).
Other Criteria		
Size/shape	M/H	The Area is of moderate size, narrow in shape, but well buffered.
Connectivity	M	The Area is adjacent to other areas of indigenous vegetation (shrubland) and linked to areas of wetland and forest.
Long-term Sustainability	M/H	The Area is partly modified by the presence of introduced species but is resilient.
SNA (yes/no):	YES	

ASSESSMENT of AREA 455e (against District Plan criteria):

Primary Criteria	Rank	Notes
Representativeness	M	A modified example of indigenous vegetation that is typical of the ecological district.
Rarity	M	A number of locally rare species are present, including tree nettle (<i>Urtica ferox</i>).
Diversity and pattern	M	Shrubland and herbfield communities are present, though these communities are probably less diverse than those originally present.
Distinctiveness/special features	M	The shrubland is part of a sequence including the limestone bluffs and wetlands.
Other Criteria		
Size/shape	M/H	The Area is of moderate size, has a good shape and is partly buffered.
Connectivity	M	The Area links other indigenous plant communities and habitats.
Long-term Sustainability	L/M	Active management will be required to maintain the indigenous plant communities.
SNA (yes/no):	YES	

Final Consideration (of other matters, Section D, page B-19):

The steep grassy slopes that support the indigenous shrubland are grazed though some important values have persisted. The intensity and type of grazing on these slopes will influence the continued survival of indigenous species, especially herbaceous species.

Discussion:

Area 455d easily meets the District Plan criteria for a Significant Natural Area. Area 455e also meets the District Plan criteria. Furthermore, if the two areas are assessed together, that larger area would also easily meet the District Plan criteria.

TIMARU DISTRICT SNA SURVEY

AREA 455f

Area Number: 455f	Area Name: Tengawai Flat Creek South Limestone	Date: 4 November 2005
Property: Hasselman	Surveyors: Mike Harding and Kennedy Lange	
Weather Conditions: cloudy and cool		Time Spent at Area: 1 hour

Location (central grid reference): J38: 473-549	Nearest Locality: Cave	
Ecological District: Fairlie	Approximate size of Area: 5.1	Altitude: 200 to 250 m

General description of Area:

A series of limestone bluffs and boulders and intervening moderately-steep slopes on the southern side of the mid-reaches of Tengawai Flat Creek, on the north side of Brothers Road.

General description of plant communities and habitats:

Sparse rockland plant communities on limestone bluffs and talus. Intervening areas dominated by pasture with scattered shrubs, kowhai trees and boxthorn.

Detailed vegetation description:

The limestone bluffs and boulders are sparsely vegetated. Indigenous species on or associated with the limestone are porcupine shrub, matagouri, *Coprosma propinqua*, toatoa, *Calystegia tuguriorum*, *Asplenium lyallii*, *Colobanthus* aff. *strictus*, *Epilobium* sp. and a single mahoe bush. Several large old kowhai trees are also present. Boxthorn shrubs are relatively common. Other introduced woody species present are elderberry and horehound.

Notable flora, fauna or habitats:

The presence of large old kowhai trees adjacent to the bluffs and *Asplenium lyallii* on the limestone notable. These north-facing slopes are more sparsely vegetated than the shadier slopes across the valley (Area 455d and Area 455e), though are probably largely representative of dry limestone bluffs in the area.

The limestone bluffs provide useful habitat for welcome swallow (and the introduced rock pigeon). The bluffs may also provide roosting or nesting habitat for the nationally-endangered long-tailed bat, as the bluff is close to the known range of bats in South Canterbury

General condition of Area:

Steeper parts of the bluffs are well protected from the effects of activities such as burning and grazing. Other parts of the area are substantially modified and dominated by introduced pasture species. Sheltered sites at the base of the steeper bluffs are highly modified by stock, notably the trampling of soils and thick deposits of dung.

Notable plant and animal pests:

Boxthorn is relatively common. Boxthorn favours dry limestone slopes and poses a significant threat to the ecological integrity of the area. It is a major problem in other parts of Canterbury (such as in the lower Waitaki valley). Domestic stock (sheep, deer and/or goats) are having a significant impact on accessible parts of the limestone bluffs. Rock pigeons are present.

Boundaries: (buffering, fencing, adjoining plant communities/habitat etc.):

Area 455f is defined by the extent of the limestone bluffs and the associated areas of limestone soils. Indigenous vegetation is scattered and sparse within this area.

Present management and management issues:

Important management issues are the control (and ideally, the removal of) boxthorn and elderberry. The type and intensity of grazing is also an important management issue, as accessible parts of the bluffs and the associated areas of limestone talus and soil are vulnerable to high densities of grazing animals.

Property Owner Comment:

ASSESSMENT (against District Plan criteria):		
Primary Criteria	Rank	Notes
Representativeness	M/H	An example of rockland and associated vegetation on dry limestone bluffs that is typical of the ecological district.
Rarity	M	A locally rare species, <i>Asplenium lyallii</i> , is present.
Diversity and pattern	M	Species diversity on the limestone is low, but probably only slightly reduced from that originally present.
Distinctiveness/special features	M	The extent of the dry limestone habitat and the presence of older components of the vegetation (kowhai trees) are special features.
Other Criteria		
Size/shape	M/H	The area (covering the extent of the limestone substrate) is moderate in size, has a good shape but is (at present) poorly buffered.
Connectivity	M	The area is not connected, though relatively close, to other areas of indigenous vegetation and habitat, notably areas of wetland (455a and 455b) and other areas of limestone (Area 455d and 455e).
Long-term Sustainability	M	Limestone bluffs within the area are well protected. Accessible areas at the base of the bluffs and on other limestone substrates are poorly protected and will require active management and protection to sustain ecological values.
SNA (yes/no):	YES	

Final Consideration (of other matters, Section D, page B-19):

Although the limestone bluffs are the most important feature of this area, the associated areas of limestone talus and soil (although highly modified) have been included (even though they don't strictly meet the definition of indigenous vegetation) as they form part of the limestone habitats present on this north-facing slope.

Discussion:

Area 455f meets the District Plan criteria for a Significant Natural Area. Although parts of this area are modified and support only very sparse or scattered indigenous vegetation, these areas are included as an integral part of the limestone habitats present. Note that, because of the paucity of indigenous vegetation on the gentler slopes, the District Plan rules will have little effect on the existing use of these areas.

TIMARU DISTRICT SNA SURVEY

Area 456a and Area 456b

Area Number: 456a and b	Area Name: Upper Tengawai Flat Creek	Date: 21 September 2005
Property: Hasselman	Surveyors: Mike Harding and Kathryn Hill	
Weather Conditions: fine with a cool wind		Time Spent at Area: 2 hours

Location (central grid reference): J38: 464-558	Nearest Locality: Cave	
Ecological District: Fairlie	Approximate size of Area: 5.2 and 0.4 ha	Altitude: 220 to 300 m

General description of Area:

The upper reaches of Tengawai Flat Creek on the southeast end of the Brothers Range, comprising a moderately-steep south facing slope (Area 456a) and a small rocky side gully of upper Tengawai Flat Creek (Area 456b).

General description of plant communities and habitats:

Regenerating hardwood forest with a few young podocarps (totara), an area of older taller kowhai and narrow-leaved lacebark trees, and gorse scrub at the margins (Area 456a). A small open remnant of hardwood forest (Area 456b).

Detailed vegetation description:**Main forest remnant (Area 456a):**

The forest canopy over most of the Area is dominated by mahoe, with pohuehue dominant at the forest margins. Other canopy species present are fivefinger, mapou, cabbage tree, lancewood, broadleaf, marbleleaf, fuchsia, narrow-leaved lacebark, kowhai and a few (c. 4) totara trees. The largest totara has a trunk diameter at breast height (dbh) of 51 cm; the other totara are smaller (c. 30 cm dbh).

Important understorey species present are *Helichrysum lanceolatum* and *Coprosma crassifolia*. Other understorey species are bush lawyer, lawyer, mapou, *C. rhamnoides*, *C. rotundifolia*, *Melicope simplex* and *Streblus heterophyllus*. The ground cover is dominated by *Polystichum richardii* with prickly shield fern, necklace fern, *Asplenium hookerianum*, *A. richardii*, *A. appendiculatum*, *Blechnum fluviatile*, *B. chambersii*, *Pellaea rotundifolia*, male fern and bidibid.

Additional species present near the stream at the base of the slope are pate, wineberry, weeping mapou, hen and chickens fern, bush lily and a sedge (*Carex* sp.). A patch of large crack willow trees is present beside a small pond in the stream.

Dense gorse scrub is present along most of the forest margins. Other species present mostly on the forest margins are kanuka, koromiko, *Coprosma propinqua*, *C. crassifolia*, native jasmine, scrambling fuchsia, elderberry, gooseberry, *Blechnum montanum* and hard fern.

A single shrub daisy is present amongst gorse near the forest patch (Andrew Steven, *pers.comm.*). This was not inspected, but is likely to be *Olearia bullata*, a species which is present elsewhere on the property.

Small remnant in side gully (Area 456b):

The forest canopy of this small open patch of forest is dominated by mahoe and mapou. Other canopy species present are broadleaf, cabbage tree, bush lawyer and pohuehue. A single large kowhai is present at the edge of the forest. Large crack willow trees are present further down the gully.

The forest margin and open understorey are dominated by *Coprosma crassifolia* and *Coprosma propinqua*. Also present are matagouri, *Helichrysum lanceolatum*, scrambling fuchsia, lawyer, native jasmine, gorse and one small plant of mistletoe (*Ileostylis micranthus*) on *Coprosma propinqua*. One small and rather battered totara tree is present in the understorey.

The ground cover is open and dominated by pasture grasses or bare rock. Indigenous species present include *Pellaea rotundifolia*, *Asplenium hookerianum*, *Polystichum richardii* and necklace fern.

Birds observed:

Bellbird, grey warbler, fantail and blackbird.

Notable flora, fauna or habitats:

The presence of totara is notable, as this species is representative of an important component of the original vegetation. The large kowhai and narrow-leaved lacebark trees are also notable. The main patch of forest (Area 456a) supports a relatively high diversity of species for its size. The presence of *Streblus heterophyllus* is also notable; it was not recorded during a recent survey of other areas of indigenous forest nearby. The location of the forest encompassing part of the headwaters of Tengawai Flat Creek is important, as its presence may help maintain water quality and flow that will benefit wetlands and stock water downstream. The presence of mistletoe in the smaller patch of forest (Area 456b) is notable, although this species is not uncommon in the district.

General condition of Area:

The understorey of the main area of forest is very open and the ground largely bare of plant cover. However, the canopy of most of the forest is intact and healthy, except at the margins where the native climbing pohuehue is smothering the canopy trees. There appears to be little regeneration of some important canopy species, such as kowhai, narrow-leaved lacebark and totara. In the smaller remnant (Area 456b) the canopy and understorey are open and depleted.

Notable plant and animal pests:

Wallabies were observed in both patches of forest. Possums are also likely to be present. The most significant plant pest present is elderberry, though it is mostly confined to the forest margin and is not dominant. Crack willow, gooseberry and male fern are also present, though these species do not pose a significant threat to the main area of forest.

Boundaries: (buffering, fencing, adjoining plant communities/habitat etc.):

Area 456a is well buffered by dense gorse scrub along most parts of the forest margin. It is also protected to some extent by its location on a damper south-facing slope in a broad gully. The gully, including quite extensive areas of gorse scrub, is fenced from adjoining intensively-grazed paddocks. The area of forest adjoins an area of valley-floor wetland (Area 455c) at its lower (eastern) boundary.

Area 456b is not well buffered, but is protected to some extent by its location on rocky slopes in a small gully. It is linked by crack willow trees and scattered gorse scrub to Area 456a.

Present management and management issues:

Both areas of forest have been protected informally by the landowner. Control of wallabies and possums are probably the most important management issues. Both areas of forest would benefit from the exclusion of stock, though some increased weed control effort (especially elderberry control) may be required to permit regeneration of indigenous species. Areas of gorse surrounding (and within) both areas of forest are serving useful roles buffering the core areas and providing shelter for the establishment of indigenous species. These infestations of gorse should be contained at the edges, rather than removed.

Property Owner Comment:**ASSESSMENT (against District Plan criteria):**

Primary Criteria	Rank	Notes
Representativeness	M/H	A good example of indigenous vegetation typical of the ecological district and containing components representative of the original vegetation.
Rarity	M	<i>Streblus heterophyllus</i> is rare in this part of the district. The mature kowhai trees provide an important food resource for kereru.
Diversity and pattern	M	The Area supports a relatively high number of species, though it is probably less diverse than the forests originally present in the district.
Distinctiveness/special features	M	Its presence in a valley above areas of wetland is a special feature.
Other Criteria		
Size/shape	M/H	The main part (Area 456a) is of moderate size, has a relatively good shape and is well buffered. The smaller area (Area 456b) ranks L/M by itself, though is considered here as part of the larger area (Area 456a).
Connectivity	M	The Area is connected to a wetland (Area 455c) and is part of a sequence of vegetation and habitat along Tengawai Flat Creek.
Long-term Sustainability	M	The Area is resilient but will require some conservation management.
SNA (yes/no):	YES	

Final Consideration (of other matters, Section D, page B-19):**Discussion:**

The main area of forest (Area 456a) easily meets the District Plan criteria as a Significant Natural Area. The smaller area of forest (Area 456b) does not, by itself, meet the significance criteria but is assessed here as part of the larger area of forest as it is linked to that area.

TIMARU DISTRICT SNA SURVEY

AREA 469a

Area Number: 469a	Area Name: Tengawai River Bluffs (Cave)	Date: 22 September 2005
Property: Hasselman	Surveyors: Mike Harding	
Weather Conditions: cool and damp		Time Spent at Area: 1½ hours

Location (central grid reference): J38: 472-541	Nearest Locality: Cave
Ecological District: Fairlie	Approximate size of Area: 1.2 ha
Altitude: 160 to 200 m	

General description of Area:

Steep limestone bluffs and associated slopes on the north side of the Tengawai River near Cave.

General description of plant communities and habitats:

Scattered large trees (mostly broadleaf) on and adjoining limestone bluffs and associated shrubland and scattered trees on the slopes below the bluff.

Detailed vegetation description:

The limestone bluff is steep and mostly bare. Associated with the bluff are a number trees and shrubs of broadleaf, *Olearia aviceniifolia*, koromiko, native broom and elderberry. The crest of the bluff and the steep slopes below the bluff support rank pasture with scattered shrubs or clumps of *Coprosma propinqua*, matagouri, native broom, pohuehue, lawyer and elderberry. Occasionally present are sweet brier, blackberry, old man's beard and cherry plum. Inaccessible parts of the bluffs may support other plant species.

Scattered trees of kowhai, totara, cabbage tree, broadleaf and lancewood, and shrubs of *Coprosma propinqua*, matagouri, *Olearia aviceniifolia* and scrambling fuchsia are present among broom scrub in the small gully adjoining the bluffs to the northwest.

Birds observed:

A number of rock pigeons are nesting and/or roosting in the bluffs. Paradise shelduck, fantail, starling and South Island pied oystercatcher were also observed in the area.

Notable flora, fauna or habitats:

The presence of large native trees on the bluffs is notable. Also notable is the abundance of native broom on the slopes below the bluffs. The limestone bluffs may provide habitat for other species including long-tailed bat, which may be present nearby.

General condition of Area:

The area is in relatively good condition. Although introduced grasses are dominant on the slopes below the bluff, the area does not appear to be grazed and indigenous woody species are common. Native broom, in particular, is regenerating well on the open grassy slopes. The limestone bluffs are in good condition.

Notable plant and animal pests:

The most important plant pests present are elderberry, old man's beard and cherry plum. Only one plant of old man's beard and one clump of cherry plum were observed. Hemlock is present below the bluffs. A range of other herbaceous weeds are present, though do not pose a significant threat to indigenous woody species. Broom and gorse are present nearby but are not dominant at the site.

Rock pigeons may be displacing indigenous species, such as welcome swallow and long-tailed bat, from roosting or nesting sites.

Boundaries: (buffering, fencing, adjoining plant communities/habitat etc.):

The Area is fenced and does not appear to be presently grazed. It is well buffered by the river at the bottom and by a fence and shrubland at the top. Further similar areas of bluff adjoin the Area to the northeast, and indigenous trees are present within exotic scrub in a gully to the northwest.

Present management and management issues:

Control of aggressive introduced species such as old man's beard, elderberry, cherry plum and rock pigeon are the most pressing management issues. If infestations of woody weeds are controlled or contained, and grazing is excluded, indigenous vegetation is likely to continue to re-establish at the site.

Property Owner Comment:

ASSESSMENT (against District Plan criteria):		
Primary Criteria	Rank	Notes
Representativeness	M/H	A relatively good example of the rockland communities originally present in the ecological district.
Rarity	M	Provides suitable habitat for a threatened species that may be present in the area (long-tailed bat).
Diversity and pattern	M	Species diversity is less than that originally present.
Distinctiveness/special features	M	The location of the limestone bluff close to a river is a special feature.
Other Criteria		
Size/shape	M	The Area is small but has a good shape and is well buffered.
Connectivity	M	The Area adjoins other areas of indigenous vegetation or habitat, and adjoins an area of freshwater habitat in the Tengawai River.
Long-term Sustainability	M	The limestone bluffs are resilient, but the slopes below the bluffs are vulnerable to the invasion of a number of weed species.
SNA (yes/no):	YES	
Final Consideration (of other matters, Section D, page B-19):		
The Area does not appear to be grazed at present, apart from some limited grazing on the small area above the bluffs. It is, in effect, protected informally. The Area will become more significant over time as indigenous species regenerate on the slopes below the bluff, provided some weed control is undertaken.		

Discussion:
 The Area meets the District Plan criteria for a Significant Natural Area. Its small size is compensated by its shape and the effectiveness of the buffering provided by the river and bluff. The remnant indigenous vegetation present at the Area, and in adjoining areas, provides a seed source for regeneration of indigenous vegetation in the Area. The value of the Area would be enhanced if indigenous woody vegetation were permitted or encouraged to regenerate in the small gully northwest of the Area.