

## Appendix 3: Geopreservation Site Index Table

New Zealand has a unique and extremely diverse natural landform, geology and soil heritage, due to its location and formative processes. The Geological Society of New Zealand (Hayward, B.W; Kenny, J.A (1998) Inventory and Maps of Important Geological Sites and Landforms in the Canterbury Region, including the Chatham Islands (Geological Society of New Zealand Miscellaneous Publication 98) has identified and listed information regarding the internationally, nationally and many of the regionally important earth science sites throughout the country, irrespective of their current protected status.

Within the Selwyn District there are 59 recognised sites of geological importance, ranging from geological faults, glaciers, outwash plains and alluvial terraces. Whilst the majority of these sites/ landscapes have been mapped by hand by the Society in their reference books, they have been indicated by locator spots for this study on **Figure 3**.

Each Site is listed for its Importance and Significance.

For Importance, the Inventory categorises the Sites into three levels (A-C):

- A: International: Site of International Scientific Importance;
- B: National Site of National Scientific, Educational or Aesthetic Importance;
- C: Regional: Site of Regional Scientific, Educational or Aesthetic Importance;

For Vulnerability, each Site has been classified (1-5) depending on its perceived vulnerability to human activities:

- 1. Highly vulnerable to complete destruction or major modification by humans;
- 2. Moderately vulnerable to modifications by humans;
- 3. Unlikely to be damaged by humans;
- 4. Could be improved by humans activity;
- 5. Site already destroyed (not necessarily by human activity).

| ID | Name                                | General Location                                                                                                                             | Importance | Vulnerability |
|----|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------|
| 1  | Ryton Valley debris flow            | South bank of Ryton River, 250 m up river from bridge.                                                                                       | A          | 3             |
| 2  | Goldney Hill rock avalanche deposit | 1 km south of Goldney Hill summit, Western flanks of the Southern Craigieburn Range, near Blue Hill, at the top of Porter Heights ski field. | A          | 3             |
| 3  | Mathaia River Triassic macrofossils | North Mathaia River, Rakaia Valley, true left hand side of tributary stream, 15-20 minute walk above Canyon Creek Bivvy.                     | A          | 3             |
| 4  | Rakaia River braids                 | Rakaia River runs from near Lake Coleridge in the Southern Alps over the Canterbury Plains to the coast                                      | A          | 3             |

| ID | Name                                                                  | General Location                                                                                                                                           | Importance | Vulnerability |
|----|-----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------|
|    |                                                                       | south of Banks Peninsula. Grid reference is for braids accessible from Rakaia township.                                                                    |            |               |
| 5  | Winding Creek moraine                                                 | North bank of Rata Stream, beneath Broken Hill.                                                                                                            | A          | 3             |
| 6  | Rakaia Gorge and terraces, with amethyst and garnet-bearing rhyolites | On both banks of the Rakaia River, beside the Rakaia Gorge Bridge, 14 km north of Methven. Terraces are best on right bank of gorge, upstream from bridge. | A          | 3             |
| 7  | Mt Olympus rock glacier                                               | On the southwest slopes of Mt Olympus, above the ski field.                                                                                                | B          | 3             |
| 8  | Lake Catherine alluvial fan                                           | Eastern slopes of Mt Ida.                                                                                                                                  | B          | 3             |
| 9  | Turkey Flat alluvial fan                                              | Waimakariri River.                                                                                                                                         | B          | 3             |
| 10 | Carrington Peak moraine                                               | Southern slopes of Carrington Peak, above Waimakariri Falls.                                                                                               | B          | 3             |
| 11 | Cox River rockslide                                                   | Upper Cox River, Dampier Range, west of Ellis Stream.                                                                                                      | B          | 3             |
| 12 | Waimakariri Paleocene Lingula and vertebrate horizon                  | True right bank of Waimakariri River, 1 km north of confluence of Joyce's Stream, in middle of embayed cliffs of Waimakariri Gorge.                        | B          | 1             |
| 13 | Malvern Hills Jurassic plant beds                                     | Malvern Hills, Knights Hut, Selwyn County.                                                                                                                 | B          | 3             |
| 14 | Vagabonds Inn kettle lake                                             | 6 km SSE of Lake Pearson.                                                                                                                                  | B          | 3             |
| 15 | Mt White Station kame terraces                                        | Along Mt White Station Road.                                                                                                                               | B          | 3             |
| 16 | Poverty Flat fan and glacial lake shorelines                          | Poverty Flat, Northeast side of Waimakariri River, above Poulter River.                                                                                    | B          | 2             |
| 17 | Lake Grasmere alluvial fan                                            | Lake Grasmere.                                                                                                                                             | B          | 3             |
| 18 | Curiosity Shop fossiliferous sequence and unconformities              | Curiosity Shop Limestone Quarry (disused) overlying greensand, on the north bank of the Rakaia River, opposite the Highbank Power Station.                 | B          | 2             |
| 19 | Broken, Thomas and Porter River transgressive sequence                | Castle Hill Basin.                                                                                                                                         | B          | 1             |
| 20 | Parapet Rock offset fault trace                                       | Parapet Rock, beside West Coast Road (State Highway 73), approximately 4km north of Castle Hill village.                                                   | B          | 2             |
| 21 | Coleridge Creek Oligocene molluscan fossils                           | Tributary of Porter River.                                                                                                                                 | B          | 3             |
| 22 | Lake Ellesmere                                                        | By far the largest barrier-enclosed inlet in New Zealand.                                                                                                  | B          | 2             |
| 23 | Rakaia Gorge varves                                                   | One of the best exposures and most easily accessible sites to view glacial lake varves in New Zealand.                                                     | B          | 2             |
| 24 | Selwyn River birds-foot delta                                         | Only substantial birds-foot delta in a coastal environment in New Zealand.                                                                                 | B          | 2             |
| 25 | Mt Enys scree slope                                                   | West flank of Mt Enys, Craigieburn Range.                                                                                                                  | C          | 3             |

| ID | Name                                                   | General Location                                                                                                                                                                                                                                     | Importance | Vulnerability |
|----|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------|
| 26 | Porters Pass Fault, Lake Coleridge faulted terraces    | 3 km from E end of Lake Coleridge (Red Lakes Stream).                                                                                                                                                                                                | C          | 3             |
| 27 | Lake Coleridge spillway channel                        | Homestead Road at the southeast end of Lake Coleridge.                                                                                                                                                                                               | C          | 3             |
| 28 | Porters Pass Fault, Lake Coleridge power station trace | E end of Lake Coleridge SW to Raikaia River.                                                                                                                                                                                                         | C          | 3             |
| 29 | Craigieburn pinnacles                                  | Near the junction of the east and west branches of the Harper River.                                                                                                                                                                                 | C          | 2             |
| 30 | Carriage Drive fault trace                             | Ryton River, Lake Coleridge.                                                                                                                                                                                                                         | C          | 2             |
| 31 | Ant Stream alluvial terraces                           | Ant Stream, off Esk River.                                                                                                                                                                                                                           | C          | 3             |
| 32 | Racecourse Hill outwash terrace                        | Racecourse Hill, south side of Auchenflower Road.                                                                                                                                                                                                    | C          | 3             |
| 33 | Nigger Stream moraine and terraces                     | East bank of Nigger Stream beneath Little Flora.                                                                                                                                                                                                     | C          | 3             |
| 34 | Sheffield Hill outwash terrace                         | Sheffield, north side of Wrights Hill.                                                                                                                                                                                                               | C          | 3             |
| 35 | Mounds of Misery moraine                               | Head of the Nigger Stream, above Poulter River.                                                                                                                                                                                                      | C          | 3             |
| 36 | Homebush brick, tile and pottery works, Glentunnel     | Main street through Glentunnel.                                                                                                                                                                                                                      | C          | 3             |
| 37 | Springfield Hill outwash terrace                       | Springfield, north side of Pocock Road.                                                                                                                                                                                                              | C          | 3             |
| 38 | Blackwater Lakes                                       | 5 km southeast of Craigieburn.                                                                                                                                                                                                                       | C          | 3             |
| 39 | Poulter River terraces                                 | East bank of the Poulter River, 2 km north of Waimakariri junction.                                                                                                                                                                                  | C          | 3             |
| 40 | Harper Hills Basalt                                    | On ridge crest forming Harper Hills, 2.5 km southwest of Glentunnel.                                                                                                                                                                                 | C          | 3             |
| 41 | Porters Pass Fault, Otarama trace                      | Saddle between Fault Stream (tributary of Little Kowai River) and Joyces Stream, c.3 km west of Otarama.                                                                                                                                             | C          | 3             |
| 42 | Waimakariri terminal moraine                           | Both sides of the Waimakariri River above the Poulter River junction. Moraine on the south side of the river is best preserved.                                                                                                                      | C          | 3             |
| 43 | Canterbury prehnite-pumpellyite facies                 | Very well exposed in discontinuous sequence along main road from Christchurch to West Coast, from Kowai Bridge (L35/181633) to Main Divide via Porters Pass (K35/079671), Waimakariri River (e.g. K34/065991) and bridge over Craigieburn River (K34 | C          | 3             |
| 44 | Waimakariri spillway channel                           | South bank of Waimakariri River, 3 km north of Craigieburn station.                                                                                                                                                                                  | C          | 3             |
| 45 | Lake Minchin debris dam                                | Lake Minchin, Upper Poulter River.                                                                                                                                                                                                                   | C          | 3             |
| 46 | Long Hill terminal moraine and tarn                    | Long Hill, 1.5 km west of St Bernards Saddle, West Coast Highway.                                                                                                                                                                                    | C          | 3             |

| ID | Name                                               | General Location                                                                                                                                                                                                                                     | Importance | Vulnerability |
|----|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------|
| 47 | Flock Hill solifluction features                   | 1 km north of Gorge Hill peak.                                                                                                                                                                                                                       | C          | 3             |
| 48 | Flock Hill box syncline                            | An hour's drive from Christchurch, in the Broken River-Craigieburn State Forest area.                                                                                                                                                                | C          | 3             |
| 49 | Porters Pass Fault, Porters Pass-Lake Lyndon trace | Porters Pass and S slopes of Lake Lyndon.                                                                                                                                                                                                            | C          | 3             |
| 50 | Broken River Cave                                  | Craigieburn.                                                                                                                                                                                                                                         | C          | 3             |
| 51 | Broken River landslide                             | North bank of Broken River, west of highway 73.                                                                                                                                                                                                      | C          | 3             |
| 52 | Hogs Back syncline                                 | An hour's drive from Christchurch, in the Broken River-Craigieburn State Forest area                                                                                                                                                                 | C          | 3             |
| 53 | Cass-Harper fault system                           | S side of Cass Saddle and upper Hamilton Creek.                                                                                                                                                                                                      | C          | 3             |
| 54 | Canterbury prehnite-pumpellyite facies             | Very well exposed in discontinuous sequence along main road from Christchurch to West Coast, from Kowai Bridge (L35/181633) to Main Divide via Porters Pass (K35/079671), Waimakariri River (e.g. K34/065991) and bridge over Craigieburn River (K34 | C          | 3             |
| 55 | Canterbury prehnite-pumpellyite facies             | Very well exposed in discontinuous sequence along main road from Christchurch to West Coast, from Kowai Bridge (L35/181633) to Main Divide via Porters Pass (K35/079671), Waimakariri River (e.g. K34/065991) and bridge over Craigieburn River (K34 | C          | 3             |
| 56 | Canterbury prehnite-pumpellyite facies             | Very well exposed in discontinuous sequence along main road from Christchurch to West Coast, from Kowai Bridge (L35/181633) to Main Divide via Porters Pass (K35/079671), Waimakariri River (e.g. K34/065991) and bridge over Craigieburn River (K34 | C          | 3             |
| 57 | Arthurs Pass terminal moraine loop                 | Summit of Arthurs Pass                                                                                                                                                                                                                               | C          | 3             |
| 58 | Castle Hill Basin karst                            | Spectacular karst and hogback ridges developed on limestone over basalt, within a remarkable thrust-bound tectonic basin. Includes remnants of ancient Maori rock art. A 362 m long cave is one of the most outstanding natural features             | C          | 3             |
| 59 | Rakaia River multiple mouth spit lagoon            | One of the largest and most cited spit-lagoons (hapua) on the east coast of the South Island.                                                                                                                                                        | C          | 2             |