

CRT Conference 2020 – Bus Trips

South-eastern Southland fieldtrip 19th March 2020

Welcome and overview of the day.

Invercargill to Gorge Road

We are travelling on the Southern Scenic Route from Invercargill to the Catlins.

Tisbury Old Dairy Factory – up to 88 around Southland

We will be driving roughly along the boundary between the Southland Plains and Waituna Ecological Districts. The Southland Plains ED is characterized by a variety of forest on loam soils, while the Waituna District is characterized by extensive blanket bog with swamps and forest.

Seaward Forest is located near the eastern edge of Invercargill to the north of our route today. It is the largest remnant of a large forest stand that extended from current day Invercargill to Gorge Road before European settlement and forest clearance. Long our route to Gorge Road we will see several other smaller forest remnants. The extent of Seaward forest is shown in compiled survey plans of Theophilus Heale from 1868. However even the 1865 extent of the forest is much reduced from the original pre-Maori forest extent. Almost all of Southland was originally forest covered with the exception of peat bogs, other valley floor wetlands, braided river beds and the occasional frost hollows.

The land use has changed in this area over the previous 20 years with greater intensification and also with an increase in dairy farming.

Surrounding features

Takitimu Mtns – Inland (to the left) in the distance (slightly behind us) – This mountain range is one of the most iconic mountains in Southland – they are visible from much of Southland. They are a topuni site and are of huge importance to local Maori. Maori legends are that the Takitimu was turned over and sunk when landing in Tewaewae Bay and that the chief aboard named the prominent mountain inland after the canoe. An alternative legend is that the sunk canoe was washed ashore and formed the takitimu Mtns. They are a rugged mountain range with much exposed rock and scree slopes. They are formed of Permian-Jurassic period volcanic intrusives, breccia and pillow lavas. Originally deposited under the sea, now vertical beds with measured thickness of 14km.

To the north the low hills are the Hokonui Hills – The Hokonui Hills lie along part of the Southland syncline - now known as Murihiku escarpment. When viewed from the air you can see the distinctive parallel rocky ridges of the syncline. This is the most significant geological feature of Southland Comprised of Permian-Jurassic period volcanoclastic sedimentary rocks, total thickness 10 km and world famous as the type locality of rocks of the Zeolite facies. Compressed into a syncline. The northern limb is vertical whereas the southern limb is more gently dipping. Outcrops from Kaka Point (Northern Catlins) to Mt Hamilton (Takitimu Mtns). The syncline and the Hokonui Hills delineates Northern and Southern Southland.

Stewart Island can be seen to the south (to the right and slightly behind us). The Maori name is Rakiura – land of the glowing sky. The highest point is Mt Anglem (980m high). Most of Stewart Island is now protected within Rakiura National Park. Stewart Island can be accessed by plane from Invercargill or ferry from Bluff. It is well worth a visit. The only settlement is Oban or better

known as Halfmoon Bay. There is a marine farming industry including salmon and mussels based in Big Glory Bay on the south side of Patterson's Inlet. Fishing and marine farming forms an important part of the local economy.

In front of us are the hills of the Catlins. The Catlins Hills extend from Southland into Otago. The Catlins now retain the largest extent of forest on the east coast of the South Island. The forest extends down to the coast in places. We will drive through the eastern Catlins later this morning.

Gorge Road was located in a gap or gorge within the extensive Seaward Forest. It was originally a forestry town. It has the last remaining school in the area.

Gorge Road to Fortrose

Lakes quartz gravel quarry. Pebbly quartz gravel eroded out of the uplifted Northern Southland Ranges in the late Miocene and deposited into developing inter-montane basins and underlies the soils of the area. The major use is for roading gravels. Some is exported to America and Japan for decorative purposes and for use in fish aquarium. There have been proposals to mine it for production of silicon and ferro-silicon. Some is exported to America and Japan for decorative purposes and for use in fish aquarium.

Between Gorge Road and the Mataura River we pass by forest stands. To the south (on our right) is one of few areas where the sequence from forest into wetlands being part of the extensive peat-bog systems of the Awarua Plains. We will visit areas of the coastal peat-bog and Waituna Lagoon that form part of the extensive Awarua-Waituna Ramsat Wetland of International Importance.

The Mataura River is the longest Southland Rivers, being 240km in length. The Matauri River is one of the 4 largest Southland Rivers. The others are the Oreti River (203 km length), which we will cross tomorrow on the way to Oreti Beach, the Waiau (217 length) and the Aparima (length 113 km).

Along the Mataura River and the Titiroa River on the eastern edge of the Mataura floodplain there are numerous whitebait stands. These two rivers are valued rivers for their recreational whitebait fishery.

The flood plain between the Mataura and Titiroa Rivers is largely owned by Environment Southland. The purchase of land started in 1974 with the last purchase in 1985. The total area is 2,342 ha at a cost of \$1.573M. At the time it was considered cheaper to purchase the land and lease it back for farming rather than establish floodbanks and other flood protection measures. There are several forest stands present which have been fenced by ES and has been protected with Conservation Covenants. The forest stands are mainly mixed podocarp, however there are also areas of silver beech forest – the southern-most stands in New Zealand.

purchase of 2,342 hectares at a cost of \$1.573M with approximately 340 hectares remaining in private ownership.

The land was purchased for a variety of reasons, with the most important being the economic and engineering difficulties associated with providing flood protection to both banks of the tidal reaches of the river. While one bank, the right bank, was able to be protected, the left bank and the larger area provided difficulties due to the low ground levels in relation to the river (up to 3.5 metres lower adjacent to the Titiroa Stream and the ground level by the Mataura River). Lack of river gradient in this tidal reach of river required stopbanks of up to 5 metres high to be constructed to carry design flows.

Also of concern was the need to allow upstream flood protection works to proceed without the risk of possible compensation claims for damages in the floodway resulting from upstream works in the event that flood protection could not be provided in the floodway.

Flood protection for the right bank was constructed in 1984-1986 consisting of 15.5 kilometres of stopbank costing \$1.010M with an outfall tide gate structure costing \$286,000 replacing an existing structure constructed in 1923 and upgraded in 1950, controlling the Gorge Creek outfall.

The lower Mataura stopbanks have been designed for a 50 year return period, i.e. 2,500 cumecs with free board of 0.4 metres.

On the left bank, the Titiroa Stream was diverted into the Mataura River directly opposite where it emerges from the hills and a tide gate structure built on a bridge on State Highway 92 in 1916. The tide gate structure was demolished by a flood in 1972.

After the completion of the stopbanks on the right bank of the Mataura River, a tide gate and weir was constructed at the site of the original tide gates and completed mid 1987 at a cost of \$255,000.

Stopbanks totalling 3.72 kilometres were constructed along the Titiroa Stream cut-off and alongside the Mataura River so as to regularise the riverbank to provide protection to 2,000 metres above normal before sill over into the floodway occurs.

Above the Titiroa River is a gully that ES has planted in totara. The intention is that this a long-term forestry option and that the totara could be available for harvest in the future.

Fortrose is located at the mouth of the Toetoes or Matura River Estuary. The Mataura flows southward from the inland mountains to the Southland coast. The long-shore drift of sand has formed the Fortrose Spit and forced the Mataura River to flow parallel to the coast to Fortrose with its rocky headland.

The Toetoes Estuary forms the eastern extent of the huge Awarua-Waituna Ramsat Wetland of International Importance. The estuary supports wading birds and an important population of the sedge *Carex littorosa*. The estuary is valued by locals for foundering.

The Fortrose Spit retains one of few populations of pingao remaining on the Southland coast. It also has an interesting and uncommon *Raoulia* mat daisy cushionfield lying between the fore and hind dune systems. The cushionfield is dominated by *Raoulia* sp. aff. *hookerii* which is a rare plant. The cushionfield also supports several associated rare species including a buttercup (*Ranunculus recens*), a rare forget-me-not (*Myosotis pygmaea*), a geranium (*Geranium sessiliflorum* var. *arenaria*), a native dapne (*Pimelea byallii*) and a biddibid (*Acaena microphylla* var. *pauciglochidiata*) as well as banded dotterel and pipit.

Fortrose to Curio Bay

Tokonui is the major centre of the southern Catlins area. Tokonui was a forestry town, however native forest clearance has now largely stopped. The forest that we see includes some within the Catlin Forest Park and some on private land. Generally the valley floors, lower and mid slopes are private farm land, the upper slopes and hill crests are the start of the Public Conservation Land.

Waikawa River is on our left. It has much remnant riparian forest dominated by kowhai and ribbonwood.

Waikawa township and Harbour – The Waikawa Estuary is one of the largest Catlins estuaries. As we heard from Nick Ward the Waikawa Harbour remains in relatively good condition, with much of the catchment remaining in native forest cover. There is only one commercial fishing boat that still operates from Waikawa.

Curio Bay to Fortrose

Curio Bay is the home of New Zealand sealion, Hector's dolphin and yellow-eyed penguin as well as the Jurassic aged petrified forest. We are going to walk a section of Porpoise Bay to Curio Bay. We will be hosted by

The Reservoir is the water body on the left (south) side of the bus. The Reservoir was created as a water supply for coastal gold mining. It is now a valued habitat.

Haldane Estuary is another of the estuary along the Southland coast. It remains in relatively good condition. A spartina control programme has been underway for many years and only occasional plants are now found.

Slope Point is the southern-most point in the South Island (not Bluff! as is commonly thought). We have two options here the first option is to walk out to the point, where you can see the coast turf communities and have views along the Catlins coast. Alternatively, you could do a short walk to look at a small dune lake within coastal Catlins forest. This dune lake and its surrounding forest is part of a c. 80ha property which has just been bought for conservation purposes and is to be protected by QEII Trust covenant and restored and enhanced.

Lake Brunton can be seen on the left (south) side of the bus. Lake Brunton is an Intermittently Open and Closed Lagoon (ICOL) an rare lagoon type. Behind is Waipapa Beach. The eastern end of Waipapa Beach has a large dune slack area that supports several rare species including *Mazus arenarius* and *Gunnera arenaria*. This dune slack was actually formed as a result of goldmining. A gold dredge was operated by The Waipapa Beach Gold Dredging Company between June 1935 and November 1937, producing 81.5 kg of gold and 23 ounces of platinum. The remains of the dredge including the arm and buckets are still present.

The Tararua Acre is the graveyard for many of the victims from the shipwrecking of the steamer S.S. Tararua. The S.S. Tararua was sailing from Port Chalmers (Dunedin) to Melbourne via Bluff on 28 April 1881 when at 5am it hit the Otaru Reef, 13km offshore from Waipapa Point. Of the 151 passengers and crew on board only 20 survived, being the worst civilian shipwreck in New Zealand's history.

Waipapa Point has the only lighthouse on the Southland coast outside of Fiordland. The point is a popular haul-out for New Zealand sealion. At Waipapa Point, beyond the lighthouse, we can see another example of coastal turf communities. Also on the beach below the lighthouse is a small population of pingao. This has been supplemented by some enhancement planting by Southland branch of Forest & Bird Society, hopefully this will be continued and expanded in the future. On

the gravel area which was the former carpark in front of the lighthouse is a small population of the southern coastal *Lepidium tenuicaule*. There are toilets available.

Lake Vincent is one of a series of coastal lakes along the southern coast. Recently parts have been fenced and riparian planting undertaken.

Friday 20 March 2020

Waituna catchment

Top of catchment is gleyed and Oxidising

Bottom of catchment is Peat wetlands

There has been a major change in land use over the last two decades with land use intensification and a large increase in dairy farming. This has resulted in a loss of water quality and associated impacts upon biodiversity. Waituna investments first large-scale dairy farm in Catchment right beside the lagoon – established in 1995. Waituna Investments' 750 cows at Lawson Road, 700 cows at Moffat Road, 599 cows at Hanson Road

Waituna lignite mine. Southern Humates. Lignite ground very finely and fed to calves – basically stops them from scouring. Also being used by Mainland minerals to slow down volatilisation of urea.

Peat mine – Diacks nursery have a peat mine to supply their garden centre and the public with potting mix. There are 3 other large scale peat mining operations in Southland supplying the horticultural market and mushroom growers.

Gravel pit restoration project – joint with WLCG, DOC, ES

Craws Creek. Land brought by Nature heritage fund as it connects to wetland. Land being restored by DOC. Area in pasture lightly grazed by neighbouring sheep farmers with progressive retirement and restoration.

On the right of the bus are views of the Little Lake or Little Lagoon a branch of the Waituna Lagoon.

Waghorns Bridge takes you to Lagoon car park and 4.5 km loop track, and viewing platform that overlooks the lagoon.

Waituna Wetlands

The Awarua-Waituna Ramsar Wetland of International Importance is c. 19,500ha extending from the Toetoes (Mataura River) Estuary to New River (Invercagill) Estuary. This is the largest of six Ramsar wetlands in New Zealand. The original Waituna Ramsar site was 3,556 ha including the Waituna Lagoon in 1976, being New Zealand's first.

Waituna Lagoon is an Intermittently Open and Closed Lagoon (ICOL) a rare lagoon type. The lagoon is separated from the sea by a gravel beach. It is mechanically opened under an opening regime authorised under a RMA consent. The lagoon is feed by three main catchments, the largest being Waituna Stream and Currans Creek and Moffat Creek. The Lagoon supports an important population of horse's mane weed (*Ruppia*) and also has several other rare plants growing around its margins. The lagoon also is of importance for water fowl and wading birds when open. Recreational use includes fishing (for brown trout) and duck hunting.

Waituna lagoon has been modified by the input of sediment and nutrients. There has been suggestions that the lagoon could “flip” into a degraded state. This has been one of the catalysts for much on farm work to improve water quality feeding into the lagoon.

The extensive wetlands are dominated by peatbog. The major peatbog vegetation is manuka shrublands and wirerush-maunka rushland. A range of other wetland types are also present including red tussockland, flax swamp and Carex fens. Only small remnants of native forest now remain, but were formerly much more extensive. The extent of forest has been reduced by fires and replaced by manuka. There are forest restoration trials underway with additional forest and wetland restoration work planned.

Invercargill

Southland Hospital – 11 years old

Stabicraft head quarters

Parts of the city are low lying – flood banks prevent flooding – the last major flood was 1984. However, parts of the city and Invercargill airport are at risk of sea level rise and coastal inundation.

New River Estuary

New River Estuary is the Invercargill estuary. Its extent has been much reduced – by c. 30%. The area occupied by Invercargill Airport is on reclaimed land. The New River Estuary is included within the Awarua-Waituna Ramsar Wetland of International Importance. Features include sequences of vegetation from forest through manuka shrubland into oioi jointed rushland.

New River Estuary has important populations of wading birds. Features include:

- Southern-most Colony of Caspian Tern – 50 breeding pairs.
- Very important over wintering site for migratory waders. (including dodwitts)
- A rich diversity of bird species.
- Some rare or occasional visitors including white heron
- Shell banks are an important high tide roost

There has been a very successful spartina control programme. There were once many hectares dominated by spartina. Now only a few plants found in a year. Dogs have become an important tool in the search for the last few plants.

Roger Sutton Board Walk traverses a lagoon left at the termination of the Invercargill landfill site. Old Invercargill Tip now planted out in natives.

Te Aaroa walkway to be a formed track all the way to Bluff

Stop at Estuary lookout - can see - Tiwai Chimney, Bluff Hill, Green Hills, Omaui Hill, Otatara/Bushy Point, ICC lease land, Stead Street causeway, Invercargill Airport (1.5m plus under water in 1984 floods), Longwood Range

Estuary has a lot of sedimentation resulting in degradation of the estuary ecology and loss of sea grass meadows

Waihopai arm

Oreti on other side

Sailing ships used to come in

Dredging used to occur in channel

Stead Street Wharf

Lake Hawkins pump station – 1532 ha catchment, 32 km drainage

Lake Hawkins Drainage District

Pumphouse and pump replacement for the Lake Hawkins drainage are planned within the next two years.

Proposed that the existing pumps be replaced with two 1.5 cumec submersible units.

Pumphouse to be replaced by a new unit to the western side of the existing structure.

Stead Street flood/storm surge protection planned upgrade by Invercargill City along the estuary area. Allowance is being made for future proofing the airport area and the road access to Otatara.

Otatara

Otatara is a peninsula between the Waihopai Arm of New River Estuary and the Oreti River (bounded in the south by the New River Estuary). It is characterized by the remaining forest (c. 18% land cover). Much of the soil is sandy. There is a chrono-sequence from recent dunes at Oreti beach to ancient dunes c. 8,000 years old. The dunes are covered by totara forest, while the sand flats (which have seasonally high water tables (i.e. in winter) are dominated by matai and locally kahikatea.

Sandy Point

Sandy Point is a peninsula between the Oreti River and Oreti Beach. Sandy Point is a 2,200ha Recreation Reserve. It is an important asset to the people of Invercargill. It is home of many of Invercargill's sports clubs including the Teratonga motor racing circuit. There is both native totara forest and exotic pine plantations. There are several walking tracks.

Oreti Beach

The beach extends from the mouth of New River Estuary to Riverton. There are extensive dunes which are dominated by marram grass. The last native pingao has disappeared. The beach has the largest population of toheroa shellfish in New Zealand.

History of Invercargill



Civic Theatre, the town hall of Invercargill – built in 1908.

Southland was a scene of early extended contact between Europeans and Maori, notably whalers and missionaries – Wohlers at Ruapuke.^[6] In 1853, Walter Mantell purchased Murihiku from local Maori iwi, claiming the land for European settlement.^[5] Otago, of which Southland was itself part, was the subject of planned settlement by the Free Church, an offshoot of the Presbyterian Church of Scotland.^[6] Settlement broadened with the discovery of gold in Central Otago in the 1860s. Today, traces of Scottish speech persist in Southland voices, with R often pronounced with a rolling burr. This is more noticeable among country people.

In 1856, a petition was put forward to Thomas Gore Browne, the Governor of New Zealand, for a port at Bluff. Due to the Otago gold rush, the region's population grew during the 1860s with the settlement of Bluff.^[7] Browne agreed to the petition and gave the name Invercargill to the settlement north of the port. *Inver* comes from the Scottish Gaelic word *inbhir* meaning a *river's mouth* and *Cargill* is in honour of Captain William Cargill, who was at the time the Superintendent of Otago, of which Southland was then a part.^[8] The settlement's chief surveyor was John Turnbull Thomson, a British civil engineer.^[9]

Under the influence of James Menzies, Southland Province (a small part of the present Region, centred on Invercargill) seceded from Otago in 1861 following the escalation of political tensions. However, rising debt forced Southland to rejoin Otago in 1870 and the provincial system, and with it the province of Otago, was abolished entirely in 1876.^[10] This debt was caused by a population decline stemming from poor returns from pastoral farming. In 1874, Invercargill's population was less than 2,500 which reflected the drift north to large centres.^[10] In the 1880s, the development of an export industry based on butter and cheese encouraged the growth of dairy farming in Southland.^[11] In December 1905, Invercargill voted in local prohibition of alcohol sales. This lasted for 40 years until voted out by returning servicemen in the Second World War. Drinking continued meanwhile, thanks to hotels and liquor merchants in outlying districts, huge volumes of beer, often in kegs, brought to private homes, or sold by the glass by keggers at hiding spots round the City. When prohibition ended, a committee of citizens persuaded the Government to give the monopoly on liquor sales in Invercargill to the specially formed Invercargill Licensing Trust. Based on a scheme in Carlisle, England, it returns profits to city amenities. Even today, alcohol is not sold in supermarkets.

In recent years, publicity has been brought to the southern city by the election of Tim Shadbolt, a colourful and outspoken former student activist and former mayor of Waitemata City, as mayor. He once appeared on a cheese advertisement stating "I don't mind where, as long as I'm Mayor". His supporters like the colour he brings to the city. His opponents refer to his controversial mayoral career in the Auckland suburbs and to his attitude to veterans during his opposition to the Vietnam War. Publicity and students have also come to the city by the Southern Institute of Technology's "Zero Fees" scheme, which allows New Zealand citizens and permanent residents to study while only paying for material costs of their study, and not tuition fees.