



Case Study

August 2021

Stream diversion planting 2020.

Ecological restoration at Drury Quarry

A planting project adjoining Drury quarry in South Auckland is connecting isolated patches of indigenous forest over 55 hectares. Stevenson Aggregates' commitment to managing environmental impacts is impressive for its scale, and attention to the conservation of locally rare plant species.

Introduction

Fulton Hogan/Stevenson Aggregates owns and operates one of the largest quarries in New Zealand at Drury, South Auckland. The quarry produces more than 3 million tonnes of crushed greywacke aggregate annually, supplying roading and concrete markets in the Auckland and Waikato regions.

Set in rolling to moderately steep hilly terrain, close to Manukau harbour and the Hunua range, the quarry's surrounding landscape is a mosaic of grazing land, remnant forest, and commercial and residential areas. Historically, the wider area was likely a mix of broadleaf, podocarp and kauri forest. Several remnants of native forest are present on Stevenson Aggregates' landholdings; the largest is Ballard's Cone (10 hectares), representative of a taraire, tawa, podocarp forest ecosystem.

Stevenson Aggregates has decided to offset the quarry's environmental impacts by protecting, restoring and creating indigenous habitat over 55 ha. The aim is to improve the ecology of existing forest fragments and freshwater streams, and to eventually create a connecting ecological corridor. The company has engaged Auckland consultancy Envoco to carry out ecological restoration, which includes pest plant and animal control, planting, and ecological surveying.

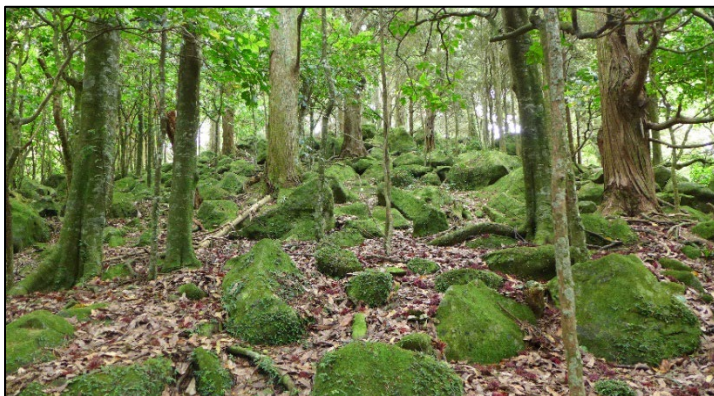
Planting trees

Deer and stock-proof fencing combined with pest plant and animal control are essential to the success of native plantings. To date, Envoco has planted approximately 85,500 eco-sourced native seedlings, and is in the third year of an 8-year ecological restoration programme. The scale of the programme is significant; more than 9 hectares will be under managed plantings.

Planting proceeds in two stages: pioneer and enrichment. The pioneer stage entails planting fast-growing, light-dependent and hardy species, including kānuka, mānuka, mahoe, *Pittosporum* spp, and hebes. Native grasses, sedges and rushes are planted at stream edges.



The size of the prize for Drury quarry – connecting forest remnants in a rural landscape mosaic.



Old growth forest on Ballard's Cone.

The enrichment stage occurs after the pioneer plants have put on enough growth to provide some shade and leaf litter to more sensitive forest species (usually after a few years), and includes species representative of local ecosystem types, eg taraire, kahikatea, matai, nikau and puriri. Envoco will plant a further 17,600 pioneer plants during 2021, and more than 12,000 enrichment plants across the site within the next 5 years.

These plantings connect existing forest fragments, and provide critical habitat for native lizards, birds and insects. Over time as plantings mature, new species will appear via bird and wind dispersal.

Surveys have identified 102 endemic plant species (species found only in New Zealand) within forest remnants, including several, locally rare species such as mangeao, *Pittosporum cornifolium* (tawhiri karo), and giant hypolepis fern.



Pittosporum cornifolium.

Pest plant and animal control

Pampas grass, privet, woolly nightshade and gorse are common exotic weeds in this part of New Zealand, and, being heavy-seeding, fast-growing plants, they can easily outcompete the natives. Envoco has removed weed infestations over large areas prior to planting and carries out ongoing control in planting areas and forest fragments.



Northern gully before weed control.



Northern gully after weed control.

Hedgehogs, mustelids (ferrets, stoats and weasels), Norway and ship rats, and possums pose a serious threat to native wildlife and plants and are controlled via trapping and poison bait stations throughout the ecological restoration areas. Between June 2019 and June 2021 Envoco caught 992 pest animals, as an indication of scale. The team has also deployed live-capture traps for feral cats, and bait stations targeting rabbits and hares. There has been an increase in observations of native bird species, such as kererū and tui, and of native seedling germination, showing that pest control is improving the local ecosystem.



Possum trapping is central to the success of replanting.



The return of kererū to forest is key to natural seed dispersal.

Freshwater management

Peach Hill Stream and its tributaries undergo regular ecological monitoring for native fish species and macroinvertebrates. Of particular importance to Stevenson Aggregates is the stream diversion channel created to accommodate overburden from quarrying activities. As part of resource consent requirements and to prevent fish disturbance, Envoco captured and relocated a total of 175 shortfin eels/tuna, and 1 banded kōkopu during the stream diversion, and released them into natural stream habitat downstream.



Translocating native fish during stream diversion.



Banded kōkopu, an endangered native fish species.

Immediately on completing the diversion channel, Envoco planted stream edges in more than 20,000 native grasses, sedges, shrubs and trees as part of improving ecological health. Two years later eels and kōura/freshwater crayfish have recolonised the diversion channel.



Riparian conservation at local streams.



Envoco has also created a fish passage at a barrier between a stream diversion channel and the natural upstream flow, and removed by hand water celery, an aquatic weed, along 1km of the stream diversion channel.



The presence of kōura is an indicator of stream health.

Lizard conservation

As part of the resource consent for quarry pit expansion, Envoco has developed a lizard management plan for the quarry. This includes maintaining a 0.25-ha skink mitigation/release site, contained within a natural boulder field and pasture habitat, and which has been fenced, planted and is monitored regularly for pest animals. Any skinks the team finds in quarry works areas will be transferred to this site. Envoco plans to establish a gecko mitigation site within the old-growth forest of Ballard's Cone for any geckos found during quarry expansion.



Skink conservation area in an area of natural, boulder-strewn habitat.

Case study sources: Stevenson Aggregates, and Envoco.