



Winstone Aggregates Biodiversity ACTION PLAN

Ever since the first humans arrived in Aotearoa, the country's ecology has been changing. Over time this change has become more rapid, and as industry has developed and the population has grown in the last 150 years, stresses on our biodiversity—this country's indigenous plants and animals—have increased sharply through the loss of natural habitat and introduction of competitive exotic species. Today, about 1000 of our known animal, plant and fungi species are threatened.

Clearly this is unsustainable. Society must collectively find ways to reduce our impact on the environment. Winstone Aggregates takes that responsibility seriously.

The Winstone Aggregates Biodiversity Action Plan is a strategy for reducing the environmental impacts of our quarrying activities, while still providing society with the aggregates it needs for its roads, buildings and industry.

In fact, it goes further than this: we aim, in the long term, to have a net positive impact on those sites where we are active. That is, to leave those areas and their surrounding areas in better condition environmentally than when we began.

The plan is a work in progress. There is much that we don't know. Part of the plan is therefore to fill those gaps in our knowledge. Some of what we learn, such as from the revegetation trials at the Whitehall Quarry (p10), may have applications for the wider community, and we will happily share those learnings with others.

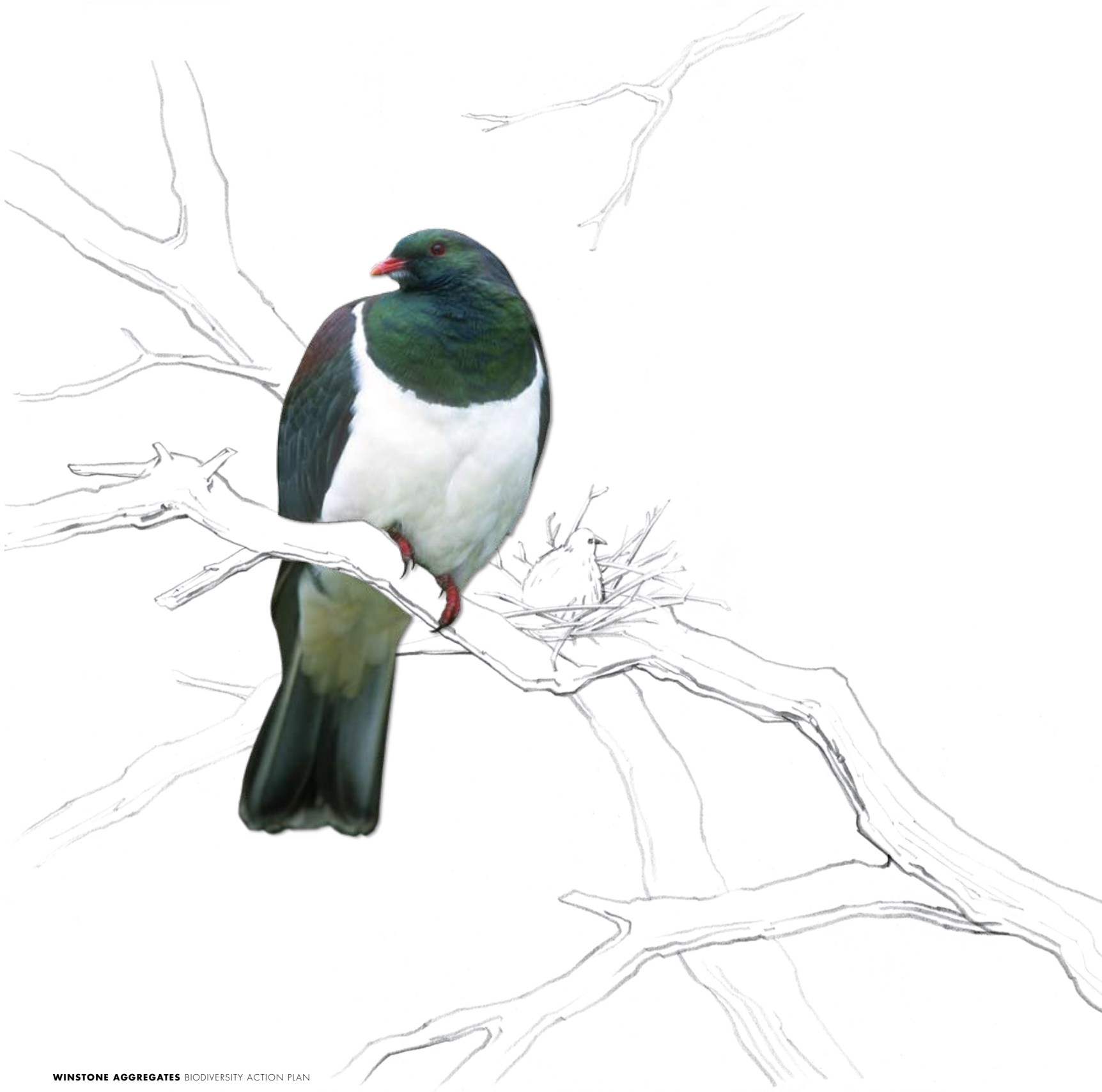
To reverse the decline in plant and animal species, our thinking must extend beyond 'fencing off' parts of the environment from

human activity. Much of the land that humans prize for our cities and farms is rich ecological habitat – so, important as reserves are, they are far from a complete answer.

We need to find ways to continue enjoying the natural riches of this land – for both leisure and wealth creation – without pushing the species we share it with towards extinction.

“We cannot continue to think of protected and productive places separately... We have to manage this biodiversity as best we can in farming and forestry environments and alongside marine industries, while ensuring a sustainable return from these activities.”

NEW ZEALAND BIODIVERSITY STRATEGY,
New Zealand Government, 2000



Better than before: The Hunua Quarry Biodiversity Action Plan

Much of our work takes place in areas that have been environmentally degraded to some degree by previous activities. That gives us an opportunity to return those sites to something *closer* to their natural state than before.

That's the thinking behind the Hunua Quarry Biodiversity Action Plan.

The Hunua Quarry property covers 250 hectares in the Hunua Ranges, south of Auckland, and comprises areas of quarry and regenerating native bush and forest.

The first step in any biodiversity plan is to understand what plants and animals are living in the area right now. So, in 2001, we commissioned a study to do just that.

We learned:

- Forestry, farming and quarrying over the last 150 years have removed all the native forest within the quarry; however, about 25 hectares of moderately high-quality forest has since regenerated, along with a lot of younger scrubland and bush. Some of the higher-quality stands are 'islands' separated from each other and similar forest on adjacent land by scrubland and quarry operational areas.

- At least 26 different bird species live within the quarry, the most notable being the native pigeon.
- Possums and goats are plentiful. Cattle from neighbouring farms also frequently find their way into the quarry.

The quarry is, of course, part of a wider ecology. The Hunua Ranges themselves are a 'mixed values' area; that is, a combination of recreation and conservation reserves, water supply catchments, farmland, private bush and, of course, industry. Human activity has had its impacts here, too; for example, water spilling out of culverts within Auckland's water supply and reserves areas have created 'plunge pools' that fish can't get up stream from in order to spawn.

Farming, too, has resulted in cattle roaming through bush areas, fouling habitats and destroying ground-dwelling animals and plants.

THE PLAN

Our plan for Hunua is ambitious. We aim to lift the ecological value of the quarry itself in the short term, and to bring some of it back to its original value in the long term.

Outside the quarry, we plan to work with local authorities, local farmers, and the community to improve the ecological value of the wider Hunua Ranges.

Within the quarry

- Retain as much of the existing higher value regenerating bush and forest as we can.
- Establish new forest to provide habitat, particularly for the native pigeon population.
- Establish a new 'wildlife corridor' within the quarry property to connect two important areas of regenerating forest outside the quarry and link regenerating areas within the quarry to this where practicable. These corridors, or linkages, will transform a number of smaller habitats, in which some animals struggle for limited resources and survival, into a single, large, more viable habitat, capable of supporting more wildlife.

Outside the quarry

- A disused quarry pit is potentially ideal for water storage. We will be working with the Councils and other interested parties on a long-term plan to protect and improve this catchment area mostly outside the quarry property, with a view to its becoming a reservoir for Auckland's water supply in future. Above all, this means keeping stock out – so we will also discuss the idea with local farmers, whose support will be important.
- We are discussing the possibility of supporting pest-free 'islands' in areas of special ecological significance.

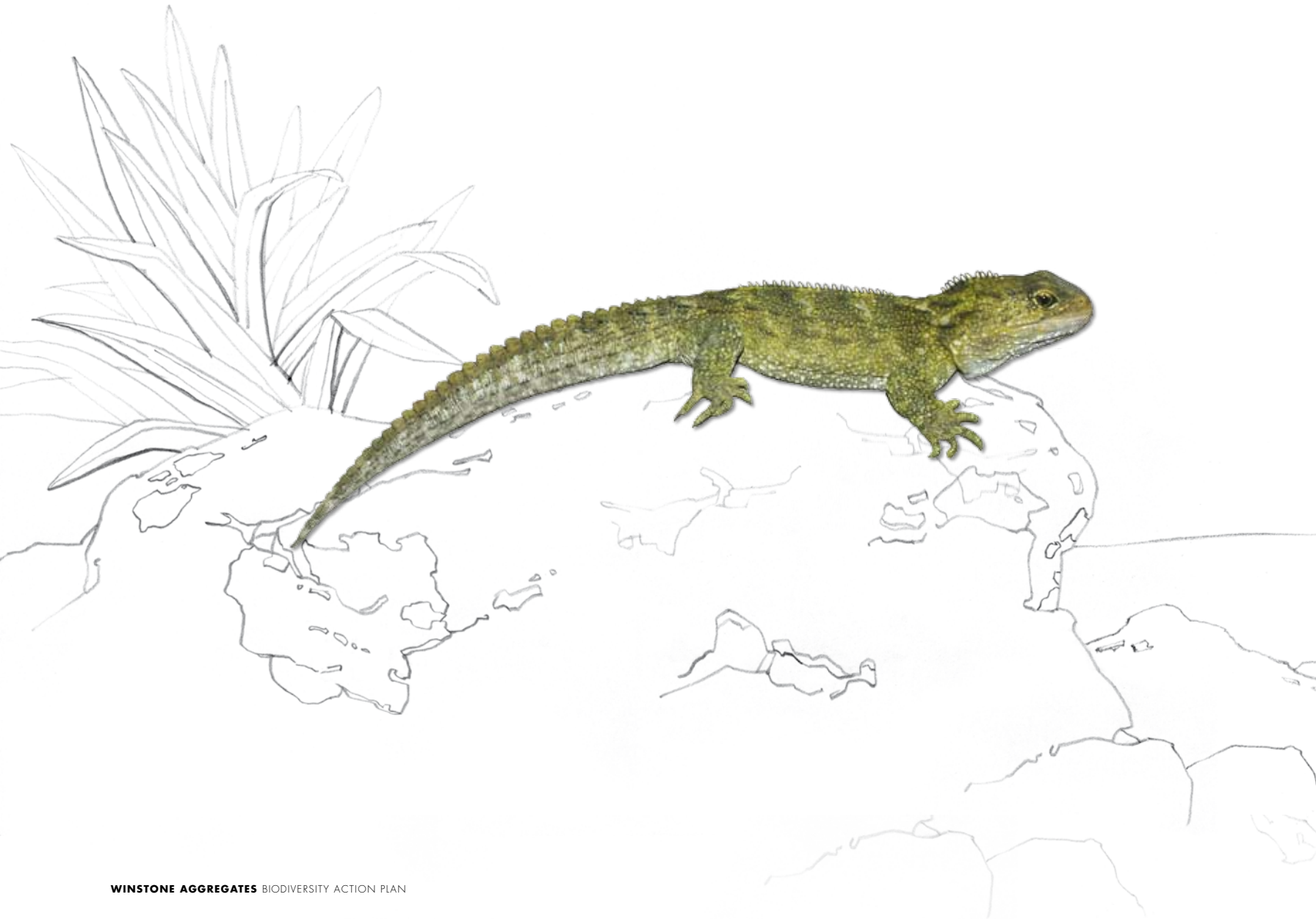
Our strategy for Hunua incorporates an important concept in biodiversity planning, namely 'environmental compensation'. The fact is, humans can't enter an untouched environment without changing it in some way. So attempts to keep most environments exactly as they are, are doomed to failure.

Environmental compensation addresses this by considering total environmental 'values', and ensuring that where our activities reduce those values in one area, we compensate by increasing values in another. So while our activities may change the environment, the *net* impact is neutral or, better still, positive.

- Hunua Quarry is one of the two largest quarries in New Zealand.
- It provides about 20 per cent of Auckland's total aggregate requirements and over 35 per cent of its concrete and asphalt.
- The rock quarried is greywacke, the same type of rock that forms the axial ranges of the North Island and parts of the Southern Alps.
- Each New Zealander 'consumes' between six and eight tonnes of aggregate per year – for roads, concrete, buildings and a variety of industrial purposes.



The value of 'corridors' or 'ecological linkages'



Until fairly recently, it was thought that the amount of bush or green space available to wildlife was the main factor in their survival. We now know that it's not just the total 'green space' that matters, but the area of *continuous* space. Hence the importance of 'corridors' – green belts that connect fragmented areas of natural habitat.

Forest fragmentation harms wildlife in a number of ways:

1. Some species (in New Zealand, mainly birds) need a large 'home range' in which to forage or breed.
2. The environment on the edge of a forest is very different from that within it, and may not support true forest species. Small pockets of forest often consist mainly of these 'edge habitats'.
3. Fragmentation reduces genetic exchanges between forest dwelling populations, resulting in inbreeding and a weakening of genetic lines.
4. Fragmentation prevents species from colonising new areas. If their existing habitat becomes degraded for any reason, they then have nowhere to move to.
5. Some species can't tolerate open areas, or become vulnerable to predators if they enter them. The kiwi is probably the best-known example, but there are many others.

In many parts of the world, forest fragmentation is the *main* cause of loss of biodiversity. Studies have shown that if remnant forest areas are connected by corridors, many animals and plants will use them to move from one habitat to another. Forest corridors are a simple way to 'give back' the forest that many species need for their survival.

Forest corridors benefit us too. They provide recreational areas and can co-exist very comfortably with farming and other human activities. They provide natural shelter belts and buffer zones that can slow the spread of agricultural pests and diseases.

Whitehall Quarry: THE STRENGTH OF MOSS

Humble as it may seem, moss is one of nature's great landscapers. When a volcano erupts or land is stripped back to rock by a natural calamity, mosses are among the first plants to appear. Their delicate roots can find the smallest opening in the rock and create a 'foothold', while the plant, now securely in place, draws nourishment from the air around it and whatever moisture it can find.

Then, as they die and decompose, mosses form the beginnings of humus, which mixes with small particles of rock to become soil. And so other plant species can gain their foothold, and life establishes itself on the barest of landscapes.

At the Whitehall Quarry near Cambridge, in the south Waikato, Winstone Aggregates, in collaboration with Landcare Research, Solid Energy, Environment Waikato, the Aggregate and Quarry Association (AQA) and Rural Supply Technologies, is harnessing moss to transform bare rock face into a green space.

Using a technique called hydroseeding, a mixture of native mosses and native plant seeds are sprayed onto steep rocky surfaces and topsoiled 'benches', along with other ingredients to help them establish.

The mosses will grow where the plants – which include toetoe, manuka and koromiko – cannot. They also form a dense cover that keeps weeds at bay, but still allows trees and shrubs to gain access.

Although experimental, hydroseeding with mosses has already had success at Solid Energy's Stockton Mine on the West Coast and shows great promise for rehabilitating roadside banks, erosion scars and other areas that are nutrient deficient and hard to gain access to.

Planting for fish

In the Lower Waikato at Puni, Winstone Aggregates is undertaking another project to revitalise part of the Waikato River flood plain or lowland.

Here, wetland natives like kahikatea once flourished. Today, however, introduced weeds abound and the native plants – where they grow at all – are mostly limited to flax and cabbage trees.

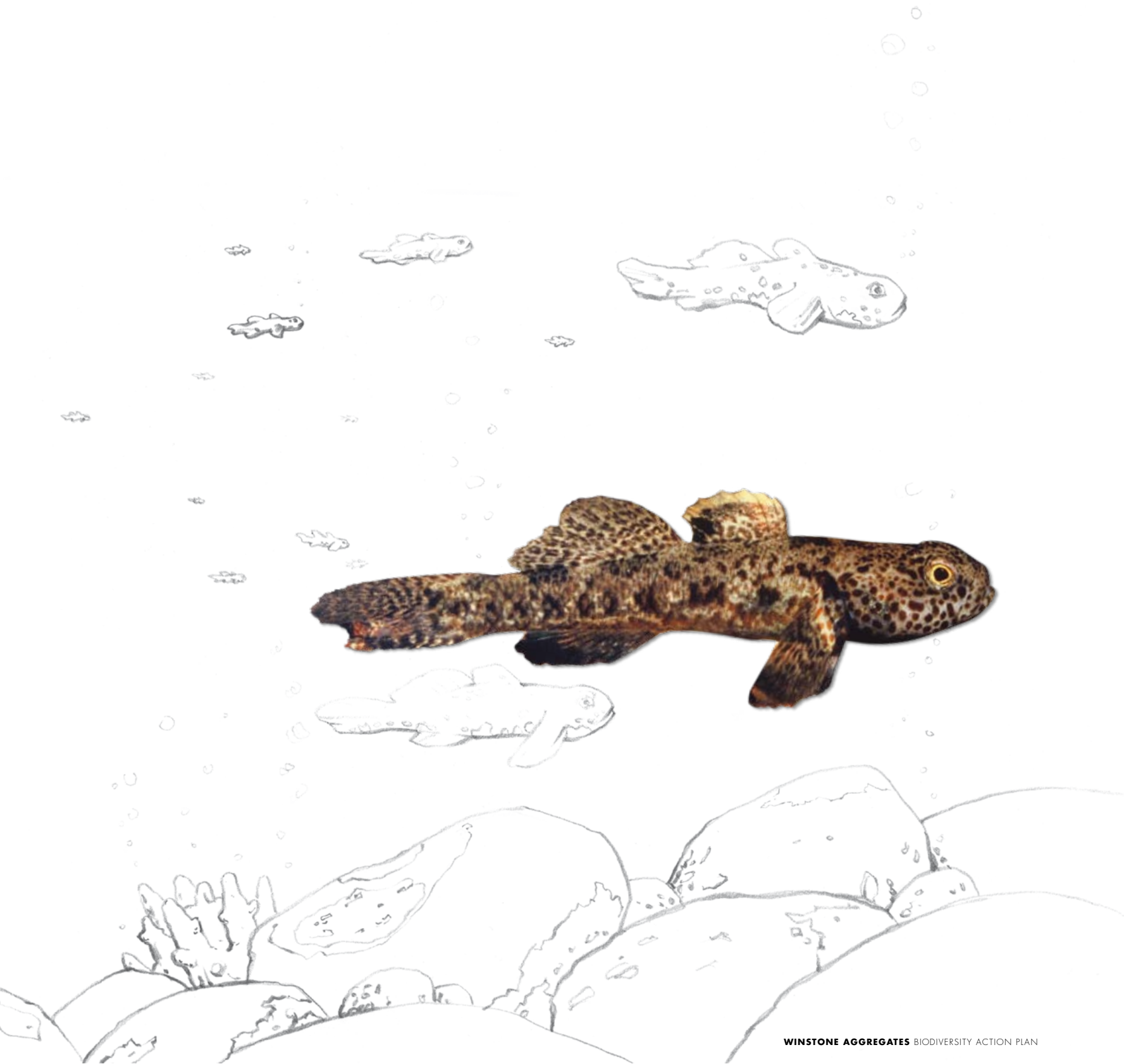
The area is also the source of high-quality sand

– an important aggregate. In return for access to this sand, Winstone Aggregates has entered a partnership with Fish & Game to create a rich wetland area where fish and other wildlife can thrive.

This long-term programme involves five steps:

1. Spray and cut all weeds, and paint stumps where appropriate to prevent regrowth.
2. 'Revisit' specific hard-to-kill weeds until they are gone.
3. Replant the area with 'early successional' species such as flax and cabbage trees.
4. In later years, replant again in larger species, particularly kahikatea.
5. Maintain by weed and pest management and keeping stock out of wetland.







The same but different



It's tempting to think that restoring vegetation or land damaged by clearing, farming, animal pests or any other means is simply a matter of replanting those species that were there before the damage occurred.

But life – quite literally – is not that simple.

Ecosystems are built over time and always through a number of stages. For example, many towering trees cannot grow in their early stages except in the shade of smaller species. So that majestic forest that once stood where you now stand needed an earlier ecosystem to give it a start in life.

What's more, it's often impossible to be sure of all the plants that grew in an area before human activity. And even if it was, would that provide a suitable habitat for the native animals we wish to see in the area? Would it meet the recreation needs of the community?

So restoration is not about creating an exact replica of what once existed, but an approximation based on what we know, what's possible, and what we want for ourselves and our children. In some cases, it's about taking new opportunities, such as redeveloping degraded wetland adjacent to the Waikato River near Puni, and developing a water reservoir at Hunua.

Restoration is about repairing and rebuilding an area of native species so they can become self-sustaining. It is the 'kick start' to a process that can then continue with little intervention from us.

It is also a delicate balance between knowing when to take action and when to keep our hands off. Gorse, for example, was long considered the 'bogey man' of the New Zealand landscape – an eyesore that invades hillsides and blocks out all other competing plants.

We now know that in fact gorse provides ideal shelter for many shade-loving native seedlings and helps build up damaged soils. It is playing a vital role in rehabilitation of hillsides around Wellington.

Even when plants compete with the species we want to establish, care must be taken. Any technique for removing weeds has the potential to harm desirable plants too, by damaging their roots (grubbing), through spray drift or by laying soil bare, allowing other, more damaging weeds to establish.

Understanding the impact

A productive quarry can last for 100 years or more. That's good for the community that relies on aggregates to build and maintain its infrastructure. But it also raises major challenges to any biodiversity plan.

The point is, restoring a disused quarry is one thing, but minimising impacts on the landscape while the quarry is in use is another thing again.

Winstone Aggregates is acutely aware of our responsibilities in this regard. Our aim is to go beyond mere compliance with our environmental obligations, and to exceed them on a regular basis.

To achieve that we must:

- Establish programmes to maintain biological values on our working sites.
- Think about likely end uses for sites once quarrying has ended, discuss those options with local communities, gain agreement, and begin planning for those uses well in advance.
- Work closely with local communities to

understand their needs and help them understand the value that Winstone Aggregates contributes to them, and the impact of our activities on their community.

- Measure the environmental impacts of our activities on each of our sites.
- Measure the environmental impacts of our activities beyond our sites.

This is a journey that excites us. In fact, we are already well on our way:

- At Otaika Quarry in Northland and Pukekawa Quarry (South Auckland), weed management and planting programmes are under way. These programmes are ongoing and will ensure weed management and revegetation becomes an easier task over time. Integrated weed management programmes like this enhance natural revegetation processes by encouraging indigenous species to establish on their own and ensure the site is more accessible for later planting projects.
- Otaika Quarry is also about to undergo a major vegetation and wildlife analysis, similar to the one we commissioned for Hunua Quarry in 2001. This will be the first step towards a fully integrated biodiversity action plan for this site.

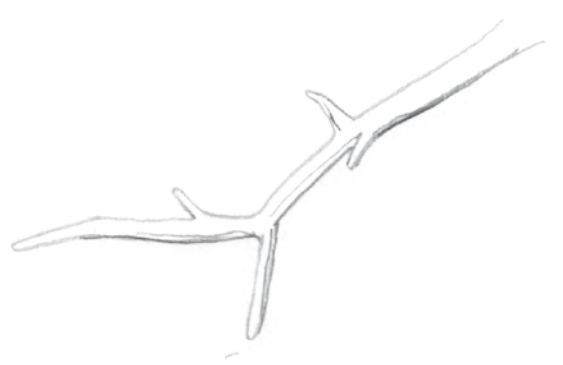
- We are investigating 'green belts' around a number of sites to not only encourage biodiversity but also to minimise the visual effects of quarry sites on our neighbours.

At times, discussion with our neighbours yields unexpected benefits. When Kaipara Kaitiaki, from whose harbour Winstone Aggregates extracts large volumes of sand, expressed concern that our activities were depleting fish and shellfish stocks, we initiated a study into the issue – recognising that the results might necessitate a rethink of our mining methods.

In fact, the study indicated that the Kaipara is similar to other harbours where depletion is largely the result of vegetation clearance and stock entering intertidal areas such as streams, estuaries and the foreshores.

Not only were they fouling the waterways, they were also damaging plants that prevent silting.

One solution, which local farmers in other harbours have readily adopted, has been to fence waterways.



WE recognise the value of working together with groups and individuals in partnership. To talk to us, PLEASE phone our Resource and Environmental Manager on 09525 9306.