



Planting the New Zealand Forest

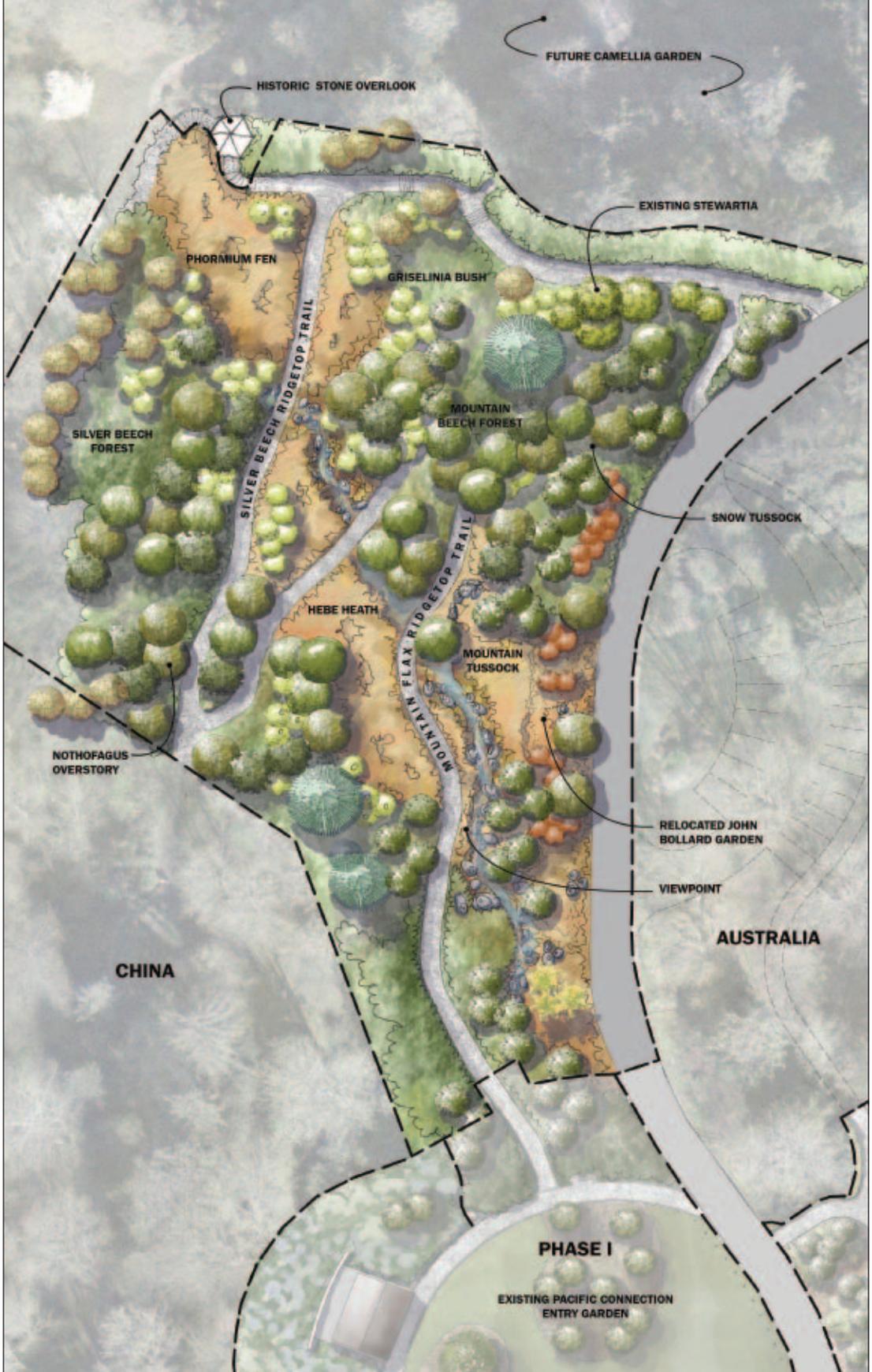
BY NIALL DUNNE

Washington Park Arboretum has a special connection to the flora of New Zealand. The first eco-geographic display created here was the New Zealand High Country Exhibit, a gift from the Seattle–Christchurch Sister City Association, dedicated in 1993. This small but dramatic, boulder-strewn garden at the south end of the Arboretum was designed to replicate Arthur’s Pass, a famous mountain pass and national park in the Canterbury region of New Zealand’s South Island. The plants in the garden, among them hebe (*Veronica*) species, plumed tussock (*Chionochloa conspicua*), and mountain

wineberry (*Aristotelia fruticosa*), were chosen to represent, in microcosm, the typical vegetation you would see on a journey through the pass.

The High Country Exhibit served as inspiration for the much grander 14-acre Pacific Connections Garden, outlined in the 2001 Arboretum Master Plan, and now under construction. It seems only fair, then, that the first of the five eco-geographic forests to be fully planted in Pacific Connections will be the 2-acre New Zealand Forest. The forest is scheduled to be planted this summer, starting in June, and will officially open to the public with great fanfare in mid-September 2013.

ABOVE: Remnant patch of mountain beech (*Nothofagus cliffortioides*) on Ben Lomond, in the Otago Region of New Zealand’s South Island. (Photo by André Richard Chalmers, courtesy Wikipedia Commons.)



Artist's rendering of the planting plan (not final) for the New Zealand Forest. (Image courtesy the Berger Partnership)

Showcasing Communities of Adaptable Plants

The New Zealand Forest will contain more than just forest. It will be composed of seven distinct vegetation sections: two southern beech (*Nothofagus*) forests, three shrublands, and two grasslands. See the planting plan on page 11. (The new forest will also incorporate the relocated High Country Exhibit; see below for details.) All of these sections are modeled on actual plant communities found in mid- to high-elevation zones on the eastern side of the Southern Alps—the mountain range that splits the South Island of New Zealand in two. Specifically, the communities are indigenous to the Central Otago region in the southeast, as well as adjacent parts of Canterbury to the north and Southland to the south.

The Southern Alps run like a spinal cord almost the entire length of South Island in a north-south direction and cause significant climatic variation between its western and eastern sides. Prevailing winds blow from the west, carrying moist air inland from the sea. The Southern Alps force much of the moisture to precipitate out and fall on the west side, while creating a rain shadow on the leeward east side. Rainfall on the west side of the island is high and is able to support very wet, temperate rainforests; the east side of the island is drier, and even becomes semi-arid down near the coast.

“To develop the plant lists for the New Zealand Forest, the UW Botanic Gardens curation committee focused mainly on the highlands and uplands of Central Otago because the climate there is relatively moderate and most closely resembles that of our own in the Pacific Northwest,” says Randall Hitchin, former collections manager at UWBG and a lead researcher on organizing the garden around ecologically realistic themes.

The two climates are not a perfect match: New Zealand doesn't experience our extended dry summers, and the winters there are generally warmer. However, since the focal communities for the forest evolved on the drier side of the South Island, they should adapt well to our summer drought. Moreover, because the plants come from relatively high elevations, they should also be sufficiently cold hardy.

“Along with representing generalized plant communities from the South Island of New Zealand and providing an immersion experience for visitors in the Arboretum, the new forest garden will showcase New Zealand native plants that thrive in the same environment we have here in Seattle and are suitable for growing in our home gardens,” says Andy Mitton of the Berger Partnership, the landscape architecture firm that designed the New Zealand Forest.

A Topographical Design

The New Zealand Forest will be located directly north of the Pacific Connections meadow and entry gardens, completed in 2008 as part of phase 1 of the Pacific Connections Garden. Unlike the level meadow and entry garden area, the new forest site has a relatively steep slope. Making the best of the topography, Mitton and Berger's principal architect on the project, Jason Henry, have arranged the plant communities in an altitudinal pattern, from alpine habitat at the top to montane and wetland habitat at the bottom.

A switchback trail, with a gradient that meets ADA requirements, will guide visitors from the New Zealand Entry Garden, down through the plantings, to the historic Stone Lookout at the base of the new display. Walking through the New Zealand Forest, you will feel like you're on a gentle hike through highland terrain, observing the landscape and the plant composition change as you descend or ascend.

The Vegetation Zones

As you enter the top of the trail, the first vegetation zones you'll encounter will be two high-altitude grasslands: “Snow Tussock” and “Mountain Tussock.” The key plants in both sections will be evergreen tussock grasses (bunch grasses) from the genus *Chionochloa*. Red tussock grass (*Chionochloa rubra*) will be prevalent in both sections. This striking plant grows up to four feet tall and produces dense clumps of arching, copper-red leaves that sway gracefully in the wind. It grows very well in the Pacific Northwest. In the “Mountain Tussock” section, *C. rubra* will be joined by a scattering of shrubs, including mahoe (*Melicytus*

ramiflorus), a small deciduous plant with smooth, grayish-white bark, serrated, oblong, dark-green leaves, and fragrant yellow flowers.”

In the “Snow Tussock” section, *Chionochloa rubra* will be interspersed with narrow-leaved snow tussock (*C. rigida*). The snow tussocks are a group of *Chionochloa* species so-named because they dominate alpine and penialpine grasslands in New Zealand. Narrow-leaved snow tussock grows three feet tall and produces slim, tawny green leaves and graceful, silvery flower heads.

On the other side of the trail, downslope from the tussock grasslands, you’ll see a subalpine heath (shrubland with open, low-growing vegetation) dominated by different species of hebe. The “Hebe Heath” will be a wonderful showcase for this iconic genus in the flora of New Zealand. Species will include *Veronica pimeleoides*, a compact evergreen shrub with an upright habit that grows two feet tall and bears attractive, silver-blue foliage and pale lilac summer flowers. Another will be *Veronica subalpina*, a bushy, three-foot evergreen shrub with bright green, lance-shaped leaves and white, late-summer flowers.

Continuing down the trail and looking upslope, you’ll observe the tussock grassland transition into another shrubland, “Griselinia Bush,” just before the first trail switchback. This section will be a mixed shrubland dominated by kapuka (*Griselinia littoralis*), a fast-growing evergreen shrub that thrives in rocky dry soils. Often cultivated as a hedge plant in New Zealand and Great Britain, kapuka is prized for its versatility and thick, rounded, glossy, yellow-green leaves. Two species of *Pittosporum*—lemonwood (*P. eugenioides*) and kohuhu (*P. tenuifolium*)—will also feature prominently in this section. Native to forest margins in New Zealand, both are large, evergreen shrubs with handsome glossy foliage and showy, fragrant, five-petaled summer flowers. Lemonwood boasts lemon-scented leaves and pale yellow flowers, while kohuhu bears stunning, almost-black new shoots and purple flowers.

At the first switchback, you’ll hit the treeline and enter a small southern beech (*Nothofagus*) forest, one of two main forest types found in

New Zealand (the other being conifer-broadleaf forest). The canopy, when it’s grown in, will be dominated by mountain beech (*N. cliffortioides*), the smallest of the country’s five *Nothofagus* species and a denizen of high-elevation sites with relatively dry soil. Mountain beech is an elegant, medium-sized (it tops out at 60 feet), fast-growing tree with ascending, fan-like branches and small, curled, ovate evergreen leaves. At high elevation, southern beech forests typically don’t have a dense or tall understory, and the “Mountain Beech Forest” section will be sparsely but judiciously underplanted with a selection of evergreen shrubs and perennials, including mountain astelia (*Astelia nervosa*), a phormium-like herbaceous perennial with light green and grey foliage, and snow totara (*Podocarpus nivalis*), a hardy, dense, low-growing conifer with dark-green needles and small, red, yew-like berries.

Coming out of this first section of forest, you’ll once again walk through the “Hebe Heath” before entering a second *Nothofagus* forest, this one dominated by silver beech (*N. menziesii*). Slightly larger than mountain beech, this evergreen species sports distinctive, small, double-toothed, oval-shaped leaves. It prefers moister, more fertile soils, and on the east side of the Southern Alps it is usually found downslope from mountain beech in ravines and other areas where water collects. The understory in the “Silver Beech Forest” will feature the unusual mountain five finger (*Pseudopanax colensoi*), an evergreen shrub with five fleshy leaflets arranged fanwise on short stems, *Hebe subalpina*, and more.

The second of two switchbacks on the main trail will occur inside the “Silver Beech Forest.” As you continue downhill and out of the canopy, you’ll come to the final section of the display, “The Phormium Fen”: a wet meadow-shrubland dominated by swamp flax (*Phormium tenax*). This fabulous phormium forms an erect clump of long, strap-like green leaves up to 6 feet tall. Occasionally, rigid flower spikes shoot high up above the foliage in summer and bear showy red blossoms. Among the plants accompanying swamp flax in this section will be red tussock grass and cabbage tree (*Cordyline australis*), a



tropical-looking but hardy small tree with clustered, sword-like green leaves and dense panicles of fragrant, white, spring flowers.

Garden Room With a View

The first designs for the New Zealand Forest were created back in the mid-2000s by the landscape architecture firm The Portico Group, when it drew up the initial plans for the entire Pacific Connections Garden. The plans included a preliminary plant list for New Zealand, vetted by the curation committee with the aid of plantsman Dan Hinkley. Some ideas for arranging the plants into different associations were also hashed out. When the Berger Partnership took over from



Portico in 2008, following the completion of phase 1 of Pacific Connections, they built off the bones of the original plans for the forest to get it to where it is today.

“In the Portico plan, *Nothofagus* had been laid out to form an overall forest canopy over the entire garden,” says Mitton. “As we further developed the plan, we realized it would be nice to keep a clearing through the garden that would allow people to see down from the tussock grasslands at the top of the path to the historic Lookout structure, and beyond that to Azalea Way and the University of Washington. So we pushed the *Nothofagus* to each side of the garden, grouping them into the Mountain Beech

ABOVE: Two key plants in the new forest garden will be red tussock grass (left) and swamp flax (right).

and Silver Beech sections. After this happened, a consensus quickly developed about which other plant associations to include to complement the forests, and the plan fell into place.”

The line of sight through the two *Nothofagus* forests flows from top of the trail diagonally through the garden over the Hebe Heath and Phormium Fen. Tracing the line is a wide, very dramatic rock-filled swale or dry creek bed that will help drain water from the forest site, which suffers from poor drainage. The rock swale is inspired by high alpine scree environment typical in the Canterbury region of South Island. Besides conveying water from the site, this and other smaller rock swales will,



Mitton adds, provide structure to the garden that will be very young when planted.

Seed Provenance

An important component of the new ecogeographic forest, and the four others to follow, is that most of the plants are grown from wild-collected seed of

known origin, or provenance. For example, the cabbage trees in the Phormium Fen were propagated from seed collected by Cistus Nursery (the nursery in Oregon contracted to grow the plants for the New Zealand Forest) at Lake Wanaka, in the Central Otago region. “The elevation there is around 900 feet,” says UW Botanic Gardens new plant curator Ray Larson. “So our plants should be hardier than most in cultivation.”

ABOVE: The distinctive leaves of silver beech, *Nothofagus menziesii*. (Photo by Kahuroa; courtesy Wikipedia Commons.)



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Most plant species are genetically variable, and distinct populations of a plant often have genetic differences that make them better adapted to their local environmental conditions. Knowing the seed provenance of the plants enables UWBG horticulture staff to match the environmental conditions at the source in New Zealand to the ones in Seattle, and helps ensure that the plants will be genetically equipped to adapt well here. Using wild-collected seed of known provenance in the new garden will also allow staff to practice *ex-situ* (or off-site) conservation of plant species that are threatened—or may become so—in their homeland.

Relocated High Country Exhibit

Another important component of the New Zealand Forest will be the High Country Exhibit, which has been moved from its original spot directly across

Arboretum Drive to the top of the Mountain Tussock section. The move was necessary to make way for the eventual creation of the Australia Forest, but also for a new bus turnaround and bathroom facilities to service Pacific Connections. UWBG gardeners were able to transplant many of the plants from the original garden. The ones that didn't make it will be replaced.

In early May, contractors from Marenakos Rock Center carefully moved the large boulders from the exhibit across the street using a boom crane with a 360-degree operating radius. Mitton and project manager Andy Sheffer, of Seattle Parks and Recreation, used archival photographs to create an approximate mirror image of the High Country Exhibit's hardscape. Asked why they flipped the orientation of the boulders rather than move them as is, Mitton replied:

"I'll use an analogy to answer your question. If you move a bookcase to an opposite wall in a room of a house, you would flip the bookcase around so you aren't looking at the back of the bookcase. It's a similar situation here: The rocks were originally laid out with a predominate view from the roadway. If we picked them up and just moved them across, we would be looking at the back of the display."

The path through the boulder "pass" will also be modified. Instead of moving through the exhibit from one panel of lawn to another, as visitors could at the original site, visitors will now pass through the larger boulders in the garden via a small "loop" trail. Nearby the relocated exhibit, the Seattle-Christchurch Sister City Association is dedicating an Olmsted Centennial Bench in honor of the new forest garden. Instead of plain wooden slats, the bench will feature ipe wood carved with traditional Maori symbols by master carver Caine Tauwhare from the port town of Lyttleton, a suburb of Christchurch. (Mr. Tauwhare will be participating in the

ABOVE: Not all the mountain beech trees in the forest will be new and young.

On November 6, 2013, three 30- to 40-foot specimens were transplanted by crane from the New Zealand High Country Exhibit across Arboretum Drive into the new garden to kick-start the canopy. (Photo by Randall Hitchin.)

FACING PAGE: The spring flowers of the cabbage tree will be visible in the Phormium Fen sections of the new forest. (Photo by Sandy Austin; courtesy Wikipedia Commons.)



opening ceremonies for the New Zealand Forest on September 13 and 15.)

The Dynamics of Garden Building

Roughly 10,000 plants representing about 90 different taxa will be planted in the New Zealand Forest this summer by the project contractor, W.S. Construction, under the supervision of Sheffer and UWBG horticulture and plant records staff. The forest will be planted by vegetation zone, starting at the toe of the slope and working upwards. As part of the installation logistics, the plants will be staged at the Center for Urban Horticulture, individually accessioned into the UWBG plant collections, and then moved in batches to the forest site.

Of course, planting a forest is a long-term proposition. Once established, it will take time for plantings to mature and fill in. For example, the southern beeches that will be planted this summer are just a few years old and only between six and eight feet tall. That said, *Nothofagus* is a fast-growing species, and within 20 years, the semblance of a true forest canopy should be in place.

“It’s important to note that the curation for the garden will also be an ongoing process over the decades,” says Ray Larson, “where we will be acquiring more wild-collected and targeted plantings in coming years. And visitors should plan on us trialing different things to see how they perform here. Quite a number of the species in the garden are new to cultivation in the Pacific Northwest, so most likely there will be a few failures to go along with our successes.” Such is the nature of garden building.

The tough hydrologic conditions of the site may also prove too challenging for some species. A combination of very clayey glacial till soil and high levels of groundwater seeping from Broadmoor Golf Course make for a wet planting medium unsuitable for many of the forest’s dry-adapted residents. The drainage swales will help alleviate the problem, as will the re-grading of the soil that occurred during the creation of the switchback trail. For extra insurance, eight inches of new, amended, fast-draining topsoil will be spread on the site prior to planting. In short, the forest will be planted on mounded beds—a technique that has worked well in the New Zealand Entry Garden, which initially had drainage issues. These beds will also be convexly contoured, so that rainwater will shed from them rather than pool. UWBG gardeners will also be using soil probes and a high-tech irrigation system to try to ensure that the plants get the right amount of water they need.

One thing is for sure: The New Zealand Forest will be a unique and spectacular new garden to enjoy at the Arboretum. Visitors will be able to experience a novel and unfamiliar landscape from the ground up and see plants they have never encountered before. “For me, one of the most exciting things about working on this project has been learning about all these wonderful plants and seeing how beautiful the *Nothofagus* is,” says Mitton. “I wish more people were growing the silver and mountain beech to use locally.” ☺

NIALL DUNNE is the communications manager at the Arboretum Foundation and a member of the “Bulletin” editorial board.