

Dune plants

Why are dune plants important? | Which plants where? | Foredune plants
Mid-dune plants | Back-dune plants | Planting guidelines | Fences and accessways | Safety first

WHY ARE DUNE PLANTS IMPORTANT?

Northland's coastline is a unique and sensitive environment. Good plant cover can reduce erosion of coastal sand dunes.

Large areas of Northland's sand dunes have been modified for residential development, farmland and exotic forestry. This has led to extensive loss of native vegetation, increased weeds and dune erosion.

Restoring and protecting our coastal dunes with native plants will help restore the natural dune form and function, provide a buffer from erosion and storms and create habitat for native creatures.

This factsheet covers which plants are best for planting on Northland's dunes, plus where and how to plant them.

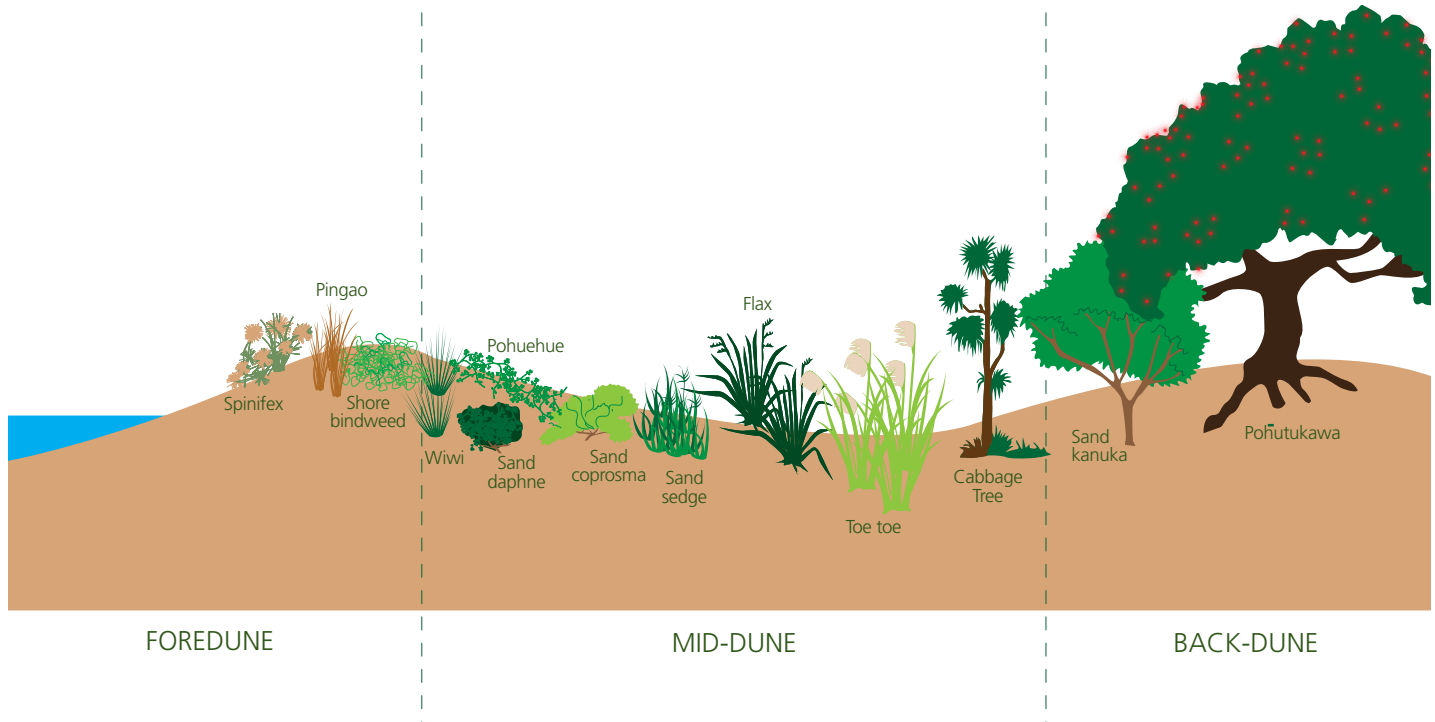
WHICH PLANTS WHERE?

Dune systems can be roughly divided into three zones – foredunes, mid-dunes and back-dunes – all of which can vary in width. Some may also have wetland areas and even lakes. Each zone provides a very different environment for native plants to grow in.

Dune systems don't necessarily have all three zones. For example, some may have little more than a foredune left where roads and buildings have been built on landward zones.

The diagram below indicates where some of the different native plant species naturally grow on an unmodified dune system (this will vary from site to site).

EXAMPLE OF A DUNE PLANT SEQUENCE



Adapted from an Auckland Council diagram

FOREDUNE PLANTS

The foredune is the most exposed zone of a dune system. Plants on foredunes need to cope with strong winds, temperature extremes, salt spray and, at times, inundation by storm waves. Very few plants are able to survive and thrive in these conditions.

Known as sand-binding plants, spinifex and pingao are the most important plants on Northland foredunes. These plants trap wind-blown sand in the foredune helping to build up and protect the dune. Other native plants found on foredunes include shore bindweed, sand tussock and sand sedge.

PINGAO

Golden sand sedge | *Ficinia spiralis*



Pingao is widely used for dune restoration projects. As well as its sand-binding properties, pingao is much prized as a material for weaving. It grows only in New Zealand and is in decline.

DESCRIPTION:

This tussock-like perennial plant grows 30-90cm tall and is found on active sand dunes. Its narrow leaves are bright green, becoming orange or yellow as they age.

FLOWERS AND SEEDING:

Dark brown flower heads appear in spring, with small flowers arranged in a spiral pattern. Small black seeds appear from early summer. In Northland the seed usually ripens in December.

THREATS:

Rabbits and stock eat pingao. Damage from vehicles and careless harvesting of leaves also reduce populations.

ESTABLISHMENT:

Pingao can be grown from seed. The plants grow best in the mobile sand at the front of the dune, though it can also grow further landward.

SPINIFEX

Kowhangatara | *Spinifex sericeus*



Spinifex is the key species used for dune restoration in Northland. It spreads quickly to effectively build an even, relatively low dune.

DESCRIPTION:

This native has long, creeping runners (stolons) and silver-grey leaves. New plants can form at nodes along the stolons as they spread out over bare sand.

FLOWERS AND SEEDING:

Male and female flowers are on separate plants and appear in spring. Their distinctive round spiky seedheads mature in mid-summer and detach from the plant.

THREATS:

It is vulnerable to damage from trampling and vehicles.

ESTABLISHMENT:

Raising plants can be challenging so they're best sourced from specialised nurseries. Spinifex establishes best when planted with fertiliser on bare foredunes where some sand movement occurs.

SPINIFEX OR MARRAM?



The exotic grass marram (*Ammophila arenaria*) was once widely used for dune stabilisation, but it's not as effective as native sand-binders in developing relatively stable foredunes. Marram grows in clumps and tends to build higher, steeper dunes that are more vulnerable to erosion and blow-outs.

Marram does look similar to spinifex so they're easily confused – some ways to tell them apart are:

- Marram has darker green, shinier leaves than spinifex.
- Marram grows in clumps with a deep root and rhizome system, while spinifex has runners that spread evenly across the top of the dune.

SAND TUSSOCKHinarepe | *Poa billardiarei*

© NZPCN Jeremy Rolfe

Sand tussock grows on semi-stable sand dunes. Once common, there are now only a few remnant populations of this native in Northland.

DESCRIPTION:

Sand tussock grows 50-90cm tall. Its smooth, yellow-green leaves are stiff and sharply pointed. They have distinctive, narrow, wheat-like seedheads.

FLOWERS AND SEEDING:

Flowers appear in early summer, and seeds appear mid to late summer.

THREATS:

It's damaged by stock grazing, browsing by rabbits, coastal development and vehicles.

ESTABLISHMENT:

Nursery-raised plants from locally collected seed can be successfully established on semi-stable, lightly vegetated sand flats and low foredunes.

SAND SEDGE*Carex pumila*

This native sedge is a sand-binder which is often found growing in damp dune hollows, on the foredune and on the edges of streams and rivers where they meet the beach.

DESCRIPTION:

Sand sedge has short, pointed, blue-green, curled leaves which are often partially buried in the sand.

FLOWERS AND SEEDING:

Flowers appear from October to December, and fruits from December to June. The distinctive yellow-brown seed-heads are found near the base of the leaves.

ESTABLISHMENT:

Sand sedge can be easily grown from seed and planted along the toe of foredunes near stream mouths. It often regenerates naturally from seed spread by freshwater.

SHORE BINDWEEDNihinihi | *Sand convolvulus* | *Calystegia soldanella*

The native shore bindweed is found growing on the foredune amongst spinifex and pingao, and also in the mid-dune area. It is sometimes mistaken for an exotic weed.

DESCRIPTION:

This perennial herb with round leaves has stout fleshy roots and branching stems that form dense patches.

FLOWERS AND SEEDING:

Solitary pink and white flowers appear from October to March. It produces smooth, dark brown seeds.

ESTABLISHMENT:

Shore bindweed regenerates naturally on most foredunes, often amongst a light cover of the native sand-binders.

MID-DUNE PLANTS

Immediately landward of the foredune is the slightly more sheltered mid-dune zone.

This semi-stable transition zone between the dynamic foredune zone and the stable landward zone is dominated by a limited number of low-growing, or hardy, wind-tolerant natives.

POHUEHUE

Wire vine | *Muehlenbeckia complexa*



Pohuehue is common on Northland dunes where it provides shelter and food for several native creatures including a native copper butterfly that only lives on this species. Planted behind the foredune sand-binders, it also helps discourage people from trampling them.

DESCRIPTION:

This wiry vine with tiny, dark green leaves forms dense springy mats up to 1m high.

FLOWERS AND SEEDING:

Numerous creamy white flowers appear in summer.

ESTABLISHMENT:

Success from planting is better in sheltered, low-lying sites. Planting with wiwi to increase shelter can improve establishment.

FLAX

Harakeke | *Phormium tenax*



Flax is very common and widespread in Northland. It provides food for bellbirds, tui and silver-eyes as well as lizards and bees.

DESCRIPTION:

Fan-like clumps of stiff, upright leaves up to 2m, with red flowers on tall stalks.

FLOWERS AND SEEDING:

Flowering usually occurs from October to December.

ESTABLISHMENT:

Flax grows easily from fresh seed, but is usually grown by the dividing rooted fans from established plants. It's best planted into damp dune hollows.

SAND COPROMSA

Tarakupenga | *Coprosma acerosa*



Sand coprosma is still fairly common on Northland dunes, but has become very scarce in more developed regions such as Auckland.

DESCRIPTION:

Sand coprosma is a low-growing shrub with small, yellow-green leaves.

FLOWERS AND SEEDING:

It produces pale blue, edible berries.

THREATS:

This plant is easily damaged by trampling.

ESTABLISHMENT:

It can be grown from seed or cuttings. Planting success is better in more sheltered sites and with protection from trampling.

WIWI

Knobby club rush | *Ficinia nodosa*



This hardy, native, rush-like plant is very common on Northland's dunes. It can sometimes be found growing on the foredune, amongst the spinifex, but is more common in the mid-dune zone.

DESCRIPTION:

Wiwi grows in rush-like clumps. Its stems are tall and thin with brown, knobby spikelets of flowers near the tip.

FLOWERS AND SEEDING:

Flowers appear from September to December, and fruits from November to May.

ESTABLISHMENT:

Wiwi is raised easily from seed and planted on exposed mid-dune sites. Clumps split from larger plants can be successfully transplanted.

SAND DAPHNE

Toroheke | *Pimelea villosa*



© PCVN John Smith-Dodsworth

This endangered native plant is in decline and is now rare. Where it does occur, sand daphne forms low-growing circular shrubs scattered along the lightly vegetated transition between the foredune and mid-dune zone.

DESCRIPTION:

This is a low-growing, sprawling shrub with small, pale green, velvety leaves.

FLOWERS AND SEEDING:

Flowers appear from September to March, and seeds from October to April.

THREATS:

It is threatened by competition from invasive exotics; trampling by stock; browsing of seedlings by possums and rabbits; seed destruction by rodents; and vehicle damage.

ESTABLISHMENT:

Sand daphne can be grown from seed or cuttings.

CABBAGE TREE

Ti kouka | *Cordyline australis*



With its distinctive form and many fragrant flowers, this iconic coastal tree grows naturally in the mid-dune and back-dune zones. Its berries provide food for the native wood pigeon (kukupa).

DESCRIPTION:

Cabbage trees grow up to 12m high, though are often smaller in more exposed mid-dune sites.

FLOWERS AND SEEDING:

Small white flowers appear in clumps October to December. The tree seeds from January to March.

ESTABLISHMENT:

Cabbage trees are grown easily from fresh seed and cuttings, and establish naturally from bird-dispersed seed. They will tolerate a range of soils and climates but dislike long periods of drought.

SPECKLED SEDGE

Carex testacea



© PCVN John Smith-Dodsworth

This attractive native sedge is found only in New Zealand. It is very hardy and grows in a variety of habitats.

DESCRIPTION:

This bright orange sedge forms small, tussock-like, dense clumps up to 0.6m high.

FLOWERS AND SEEDING:

Flowers appear from September to December, and seeds from November to May (though seeds may be present throughout the year).

ESTABLISHMENT:

It is easily grown from fresh seed or by division of established plants. It can be grown in full sun or deep shade but prefers a free draining soil.

TOETOE

Austroderia splendens



This native dune plant is often confused with the invasive pampas grass (see below).

DESCRIPTION:

This graceful, tussock-forming tall grass has leaves up to 1m and flowers up to 3m.

FLOWERS AND SEEDING:

Toetoe flowers from September to November and seeds from October to March.

ESTABLISHMENT:

It is easily grown from fresh seed and division of established plants.

TOETOE or PAMPAS?

Exotic pampas is now more common than the native toetoe due to the large volumes of wind dispersed seed.

Some handy hints to tell them apart:

- Pampas flowers in the autumn, while toetoe flowers in the spring.
- The edges of pampas leaves will cut your fingers but toetoe won't.
- Remnants of dead pampas leaves form curls at the base of the plant, but toetoe retains its old leaves.
- Pampas has no visible vein between the mid-rib and edge of the leaf, while toetoe has a vein there.
- Toetoe leaves are shinier than pampas.

BACK-DUNE PLANTS

The back-dune area is the most stable and sheltered of the three dune zones.

Back-dunes can range in width from a narrow area with limited plant species, to an expansive dune complex several kilometres wide. They provide a range of habitats and can support many plant and animal species.

SAND KANUKA

Rawiri | *Kunzea ericoides* var. *linearis*



© NZPCN Peter de Lange

Sand kanuka is endemic to the northern North Island and is most abundant from Kaitiāia north. This variety of kanuka is in serious decline and is recommended for use in back-dune restoration projects.

DESCRIPTION:

Sand kanuka is a small tree usually around 5m, but it can grow up to 10m. The leaves and flowers are smaller than those of manuka and the leaves are softer.

FLOWERS AND SEEDING:

Small white flowers appear from November to January and seeds from December to June.

ESTABLISHMENT:

Sand kanuka can be grown from seed.

HOUPARA

Coastal five-finger | *Pseudopanax lessonii*



© NZPCN Wayne Bennett

This hardy, bright-green native tree is useful for planting degraded back-dunes in combination with other species.

DESCRIPTION:

This small tree grows up to 6m tall. It has stout branches and glossy, green, leathery, hand-shaped leaves, often in groups of five leaflets.

FLOWERS AND SEEDING:

It has green flowers, and dark purple, fleshy fruit appear in autumn.

THREATS:

Houpara is palatable to stock. Rabbits can ring-bark newly established plants.

ESTABLISHMENT:

Houpara can be grown easily from seed, and establishes well on back-dune sites.

POHUTUKAWA

Metrosideros excelsa



Pohutukawa are an iconic feature of Northland beaches. The flowers provide nutrition for large numbers of native creatures including geckos which help in pollination.

DESCRIPTION:

This large, evergreen tree often has multiple gnarled sprawling trunks.

FLOWERS AND SEEDING:

Bright red flowers are present between October/November and January. Seeds appear from March to April.

THREATS:

Pohutukawa are most at risk from possum browsing, which can seriously damage or kill trees. The roots are damaged by trampling and vehicles, while large trees are vulnerable to fire.

ESTABLISHMENT:

It can be grown from fresh seed collected from natural stands along the coast. Seedlings thrive best in sites with well-drained soil and side shelter from adjacent plants. Choose planting sites carefully to avoid blocking views as trees grow.

OTHER BACK-DUNE PLANTS

| | |
|------------|---------------------------------|
| Taupata | <i>Coprosma repens</i> |
| Tauhinu | <i>Ozothamnus leptophyllus</i> |
| Ngaio | <i>Myoporum laetum</i> |
| Karo | <i>Pittosporum crassifolium</i> |
| Karamu | <i>Coprosma robusta</i> |
| Karaka | <i>Corynocarpus laevigatus</i> |
| Mingimingi | <i>Leucopogon fasciculatus</i> |
| Kohekohe | <i>Dysoxylum spectabile</i> |

PLANTING GUIDELINES

PREPARATION FOR PLANTING

- **Get land-owner permission** before starting any planting projects.
- **Historic site?** Check site for signs of early human occupation. Shell middens are present on some Northland dunes and are usually easily identified as dense layers of shells. You need permission from the New Zealand Historic Places Trust before disturbing any archaeological sites. If you are not sure it is best to check first.
- **Plan where and what to plant.** Contact Northland Regional Council for advice on dune restoration projects and always choose plants that grow naturally in the zone you will be planting.
- **Control weeds.** On mid-dune and back-dune sites, spot-spraying of dense exotic grasses before planting will reduce smothering of newly established seedlings.
- **Utilise shelter.** Wherever possible on mid-dune and back-dune sites, plant natives in sheltered spots amongst any existing vegetation cover.

SOURCING PLANTS

- **Source local plants where possible.** Plants grown from locally-collected seeds or cuttings are better adapted to the local climate and conditions.
- **Ask the land-owner first** before taking any plant material.

PLANTING

- **Plant between May and September.** Avoid planting in the hotter and often drier late spring to early autumn period.
- **Use fertiliser.** Give plants a good start with a slow-release nitrogen-based fertiliser – tablets are convenient to use.

MAINTAINING PLANTED AREAS

- **Keep on top of weeds** to prevent seedlings from being over-run.
- **Keep up the animal pest control** to prevent plants from being eaten.
- **Replant as required** if plants are lost due to erosion and die-off.

For more information on planning and maintaining a weed control programme, see the Northland Regional Council factsheet *Weed control on sand dunes*.

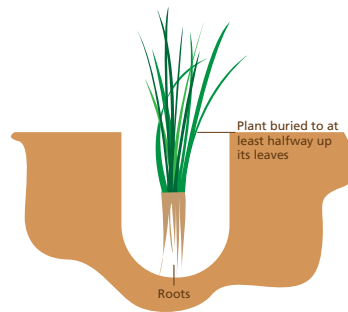
SPECIAL GUIDELINES FOR FOREDUNE PLANTS

The foredune sand-binders spinifex and pingao have some special planting requirements.

Preparation: Sand-binders do not grow well amongst other plants, especially invasive ones such as kikuyu. Clear weeds first and prevent them re-invading.

Siting: These plants grow best in the mobile sand at the front of the dune, above the mean high-water mark. Don't plant too low down on the beach or they'll be washed out.

Plant spacing: On very exposed sites, space your plants at 0.5m intervals. On more sheltered sites, plants can be spaced at up to 1m intervals. Plant spinifex and pingao in separate groups, rather than interspersing them.



Planting depth: Sand-binders must be planted deep otherwise their roots can become exposed as the sand moves. Planting deep allows roots to access the lower, wetter sand, increasing survival and encouraging rapid plant growth.

Use of fertiliser: When planting, use slow-release fertiliser (one tablet per plant). To encourage growth, apply urea in early spring and early autumn (avoid applying in heavy rain or during drought). Apply 100kg/ha, or roughly ¼ of a standard bucket per 100m².



FENCES AND ACCESSWAYS

When undertaking dune restoration it is often necessary to use fences to allow new plants to establish, protect vulnerable areas, and allow damaged areas to recover.

In some areas fencing can be temporary, while at busy beaches permanent fences might be needed. The type of fence will vary depending on whether it needs to keep stock out, deter vehicles, or guide beach users along accessways and away from vulnerable areas.

In public areas it is important to provide beach access. For high-use foredunes, sand ladders can be effective. These are built from timber joined together by chains and fixed at the top. The bottom is left loose so it can move with the dune as it erodes or builds up. For back-dune areas it is usually sufficient to use fences and/or plants such as wiwi to define paths. Climbing plants like pohuehue can be used to cover a fence.



Walkways and fences can help plants establish and protect sensitive dune areas from trampling.

MORE INFORMATION

CoastCare Northland – for more information and publications.
www.nrc.govt.nz/CoastCare

New Zealand Plant Conservation Network – for detailed information on species, downloadable factsheets plus information on threats and ecosystems.
www.nzpcn.org.nz

Dune Restoration Trust of New Zealand – for information on dune restoration and the propagation and establishment of spinifex and pingao.
www.dunestrust.org.nz

SAFETY FIRST

If you are organising working bees and planting days it is important to plan ahead to ensure that everyone stays safe, enjoys the experience and wants to come back again!

- Ensure all volunteers are aware of any hazards in the area where they are working.
- Wear covered footwear when using spades.
- Make sure anyone using tools knows how to use them safely.
- When using chemicals (like herbicides) follow all safety recommendations and wear protective clothing and equipment.
- It is best to limit working bees to four hours maximum with breaks as needed.
- If possible provide shade/shelter and refreshments.
- It's a good idea to have a first aid kit and trained first aider on site.
- Make sure you have a way of raising the alarm and communicating with emergency services.



Use protective clothing and equipment when using herbicide.

ACKNOWLEDGEMENTS

Thanks to New Zealand Plant Conservation Network, Dune Restoration Trust of New Zealand, Auckland Council, Bay of Plenty Regional Council and Waikato Regional Council for plant information, diagrams and photographs.

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