

2a Native dune plants – who lives where and why?

Getting to know our sand dune community
(basic)

Why learn about dune plants?

- Coastal dunes are one of the most degraded natural ecosystems in New Zealand.
- But, we depend upon dunes to protect us and buffer land from storms.
- We have damaged most of our dunes.
- All dunes in New Zealand have been impacted by humans in some way.
- Understanding the relationship between native dune plants and coastal sands is the key to saving our dunes.

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Objectives for today

Today we will look at some of the individual plants that make up the community of native dune plants living in the dunes

- What are they?
- What are they like?
- Where on the dune do they live?

Do we need vegetation on the dunes?

- Vegetation plays an important part in the formation and stabilisation of coastal sand dunes.
- Large areas of our dunes have been modified by housing development, recreational activities, farming practices and beach mining.
- These disturbances have made dunes less stable, and often resulted in vegetation loss and dune degradation.

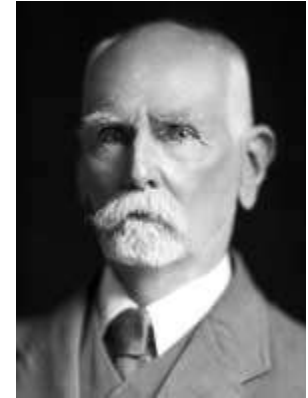
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Do we need vegetation on the dunes?

- Introduced plant species have been planted to try and stabilise these areas and in some areas have displaced native species.
- Recently, there have been some attempts to restore the natural coastal vegetation on sand dunes.

What do we know?

“It is not altogether easy to present a picture of the virgin dunes of New Zealand... (as) there are few places where man, his fires, and his grazing animals have not wrought great changes”



(From a report on the dune areas of New Zealand.
Dr. L. Cockayne 1911)

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How do we know about native plants living on the dunes?

- It's based on what remains of dune plant communities.



- It's a bit of guess work as there are no complete examples of original plant sequences left in the Bay of Plenty.

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How is an introduced plant different to a native plant?

- A native plant is one that is found living naturally in New Zealand. It was not introduced by humans. Endemic plants are also natives – they occur naturally only in New Zealand.
- An introduced plant is one that people have brought to New Zealand. These plants did not originally live here naturally. Introduced plants are also sometimes called exotic plants.

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New Zealand native dune plants are worth protecting - 75% endemic

They:

- Tolerate high velocity sand blasting
- Thrive on regular doses of salt spray
- Thrive on being buried alive
- Grow in a low nutrient medium
- Tolerate extremely dry conditions
- Tolerate a huge range in temperatures (from below Zero to 40°C)
- Produce leaves and roots that actively stabilise and trap moving sands
- Provide natural environment for native insects, animals and birds
- Add rich colour and texture to the dune environment



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Dune plant sequence

- Before looking at the different types of plants that live on the dune it is useful to look at the different parts of the dune that they inhabit.

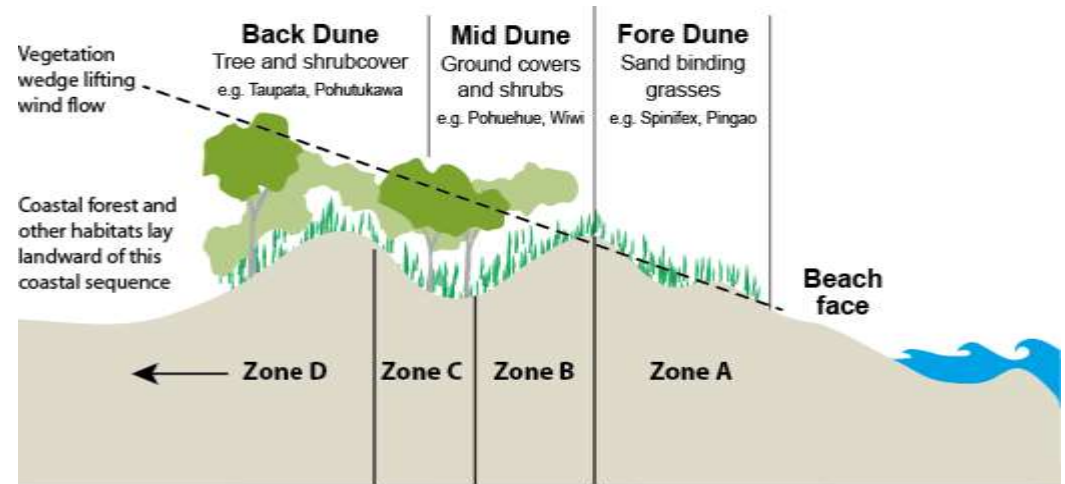
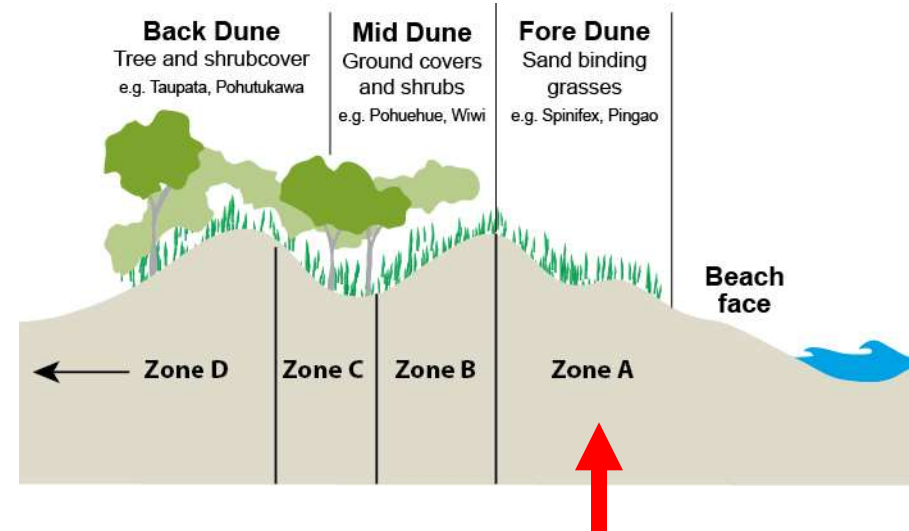


Diagram showing the vegetation sequence which probably characterised the most seaward coastal dunes of the Bay of Plenty region before human settlement.

Note: In some parts of the Bay of Plenty coast, houses now occupy zones B, C and D and development excludes native plants.

Zone A – the closest to the sea

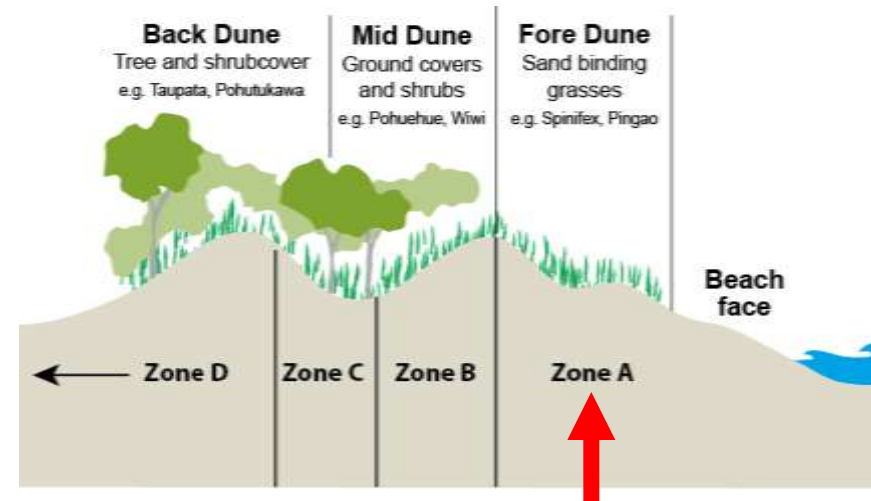
- What is the Zone A environment like for plants to live in?
 - Hostile!
 - Subjected to strong winds, waves and salt spray.
 - Lots of sand movement.
 - It can be very hot and dry.
 - Very low nutrient environment.



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Zone A – the closest to the sea

- Characteristics of plants that live here:
 - Short and low to the ground.
 - Extremely specialised growth habits are needed to survive and flourish in this hostile environment.
 - Resistant to being covered and sprayed with salt water.
 - Some such as pīngao and kōwhangatara (spinifex) are sand binders. They trap sand and restore the dune after storms.



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How Zone A plants trap the sand



Sand being trapped by kowhangatara or spinifex (Taken from Life's a beach video)

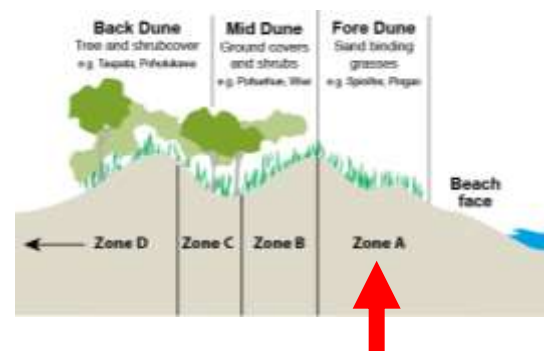
- Native dune grasses have a sparse yet rapid growth habit.
- Dune grasses slow and filter the wind, so sand drops out of the wind stream and builds up around the plant (in other words the sand accretes).
- Native sand binders build smooth, gently sloping aerodynamic dunes.

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Kōwhangatara (spinifex)

Spinifex sericeus [60cm high]

- An attractive silvery-green grass that rapidly colonises bare sand with long runners.
- Moderately resistant to grazing animals but the soft growing tips are easily damaged by trampling or vehicles.
- The “tumble-weed” seed heads are dispersed widely by the wind and also carried by water.

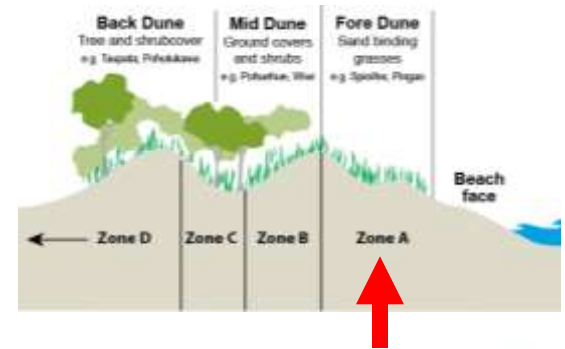


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Pīngao

Desmoschoenus spiralis [80cm]

- This bronze-green sedge turns golden-orange in winter.
- A very efficient sand trapper with runners like kowhangatara, but is readily damaged by grazing, and trampling.
- Mature plants have leaves which dry to a beautiful gold colour. They can be harvested sustainably for weaving and used in tukutuku panels (for wharenuī) and kete (small traditional baskets).

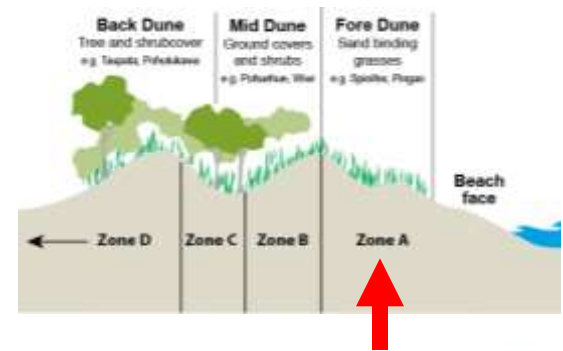


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Hinarepe, (sand tussock)

Austrofestuca littoralis [60cm]

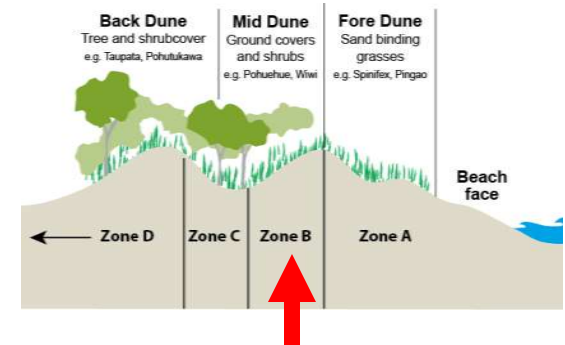
- A light-straw coloured tussock that grows in attractive upright clumps, with golden seed heads.
- Only one small natural colony and a few scattered plants remain locally as grazing and burning has wiped out other populations throughout the Bay of Plenty.



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Zone B – Back slope of foredune

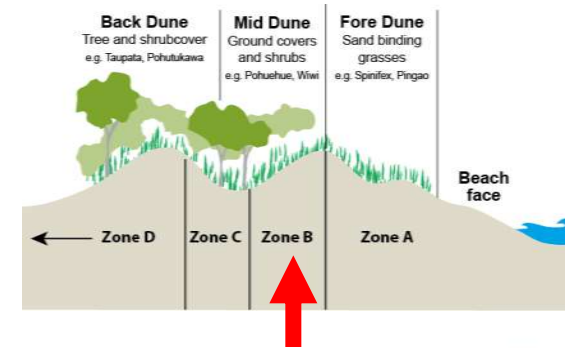
- What is the Zone B environment like for plants to live in?
 - Slightly less hostile than Zone A!
 - Some protection from wild storms with strong winds.
 - Exposure to salt spray.



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Zone B – Back slope of foredune

- Characteristics of plants that live here in this slightly more sheltered zone:
 - Shrubby plants (notice that they are taller than those found only in Zone A).
 - On-shore winds are lifted slightly by these shrubby taller plants (up to 1.5m high) which helps to provide shelter for plants further back.
 - Leaf drop and increasing shade help to supply organic matter to the sand.

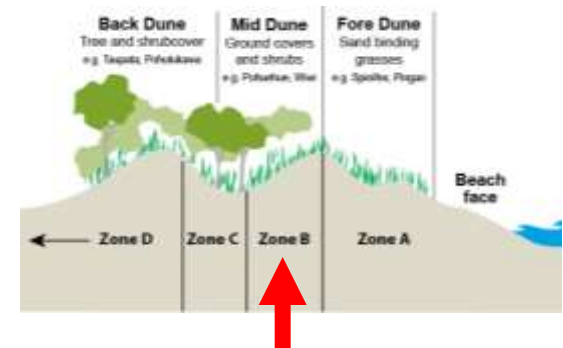


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Tauhinu

Ozothamnus leptophylla [1.5m]

- The most salt-resistant of the shrubs, it will even grow on the crests of foredunes.
- Small silver-green leaves, and profuse small cream tufted flowers appear through summer, with a pleasant musk scent.

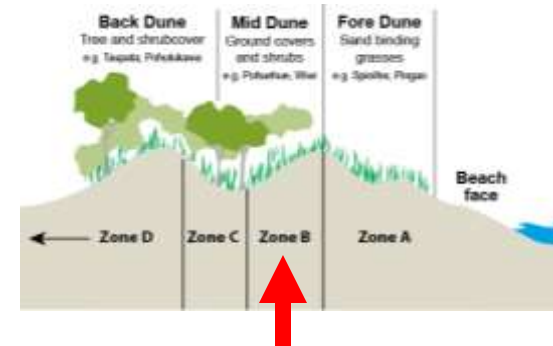


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Wīwī, (knobby clubrush)

Isolepis nodosa [1m]

- A tough but architectural plant, with stout dark green stems, and brown seed clusters just below the pointed tips.
- Adapted to a wide variety of conditions, from exposed dune tops to wet hollows.

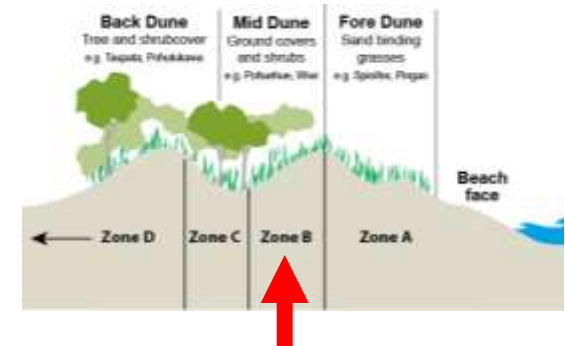


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Pōhuehue, (wire vine)

Muehlenbeckia complexa and *Puka*, *M. australis*
[variable, from 0.3 to 1m]

- These wiry creeping plants can climb fences and shrubs, or stay growing close to the ground.
- The brown stems and bright green leaves contrast nicely.
- The Rauparaha Copper butterfly caterpillar depends on these plants for food, and pheasants enjoy the abundant silver berries in autumn and early winter.

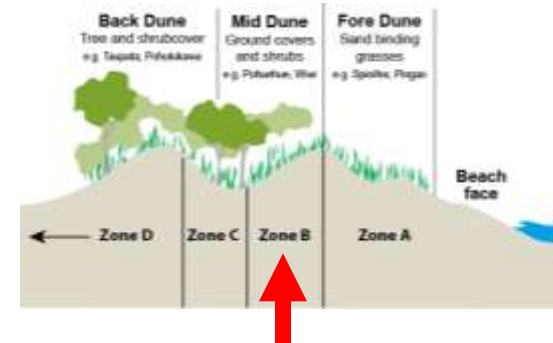


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Tarakupenga, (sand coprosma)

Coprosma acerosa [0.5 to 1.0m]

- Often used by landscapers in gardens and traffic islands.
- The combination of orange/brown intertwining supple stems and narrow green leaves make this a very unique and desirable plant.
- Stunning translucent blue or silver berries in autumn.
- Now generally uncommon in our dunes, and very rare in the eastern Bay of Plenty.

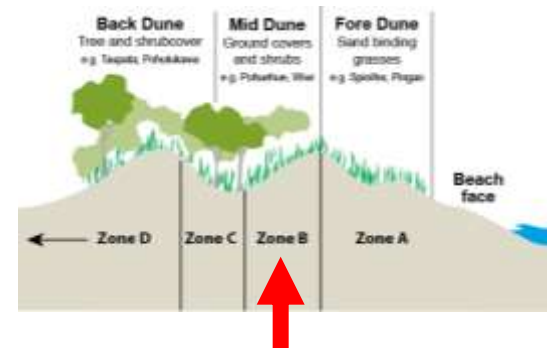


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Perehia, (sand wind grass)

Lachnagrostis billardierei [40cm]

- A native dune grass with outstanding fine gossamer-like seed heads coloured pink when young.
- The seed heads were used for dried arrangements when plants were more abundant.

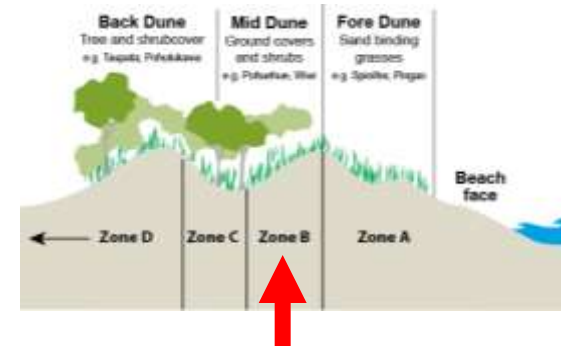


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Waiū-o-kahukura, (shore spurge)

Euphorbia glauca [80cm]

- This very elegant blue-green leaved sand trapping plant provides a total colour and textural contrast to the three above. Almost extinct in most parts of mainland North Island.
- Very palatable to grazing animals so can only be planted where rabbits etc are being actively controlled.



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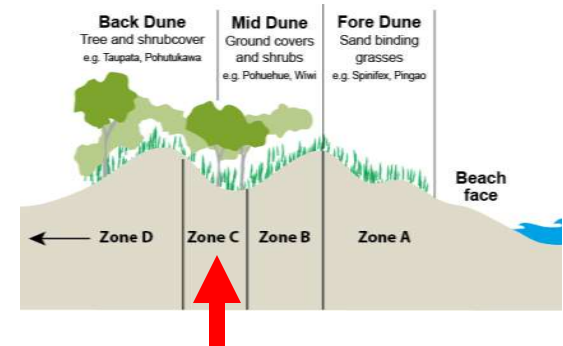
Zone A plants can also be found in Zone B



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Zone C – Mid-dune zone

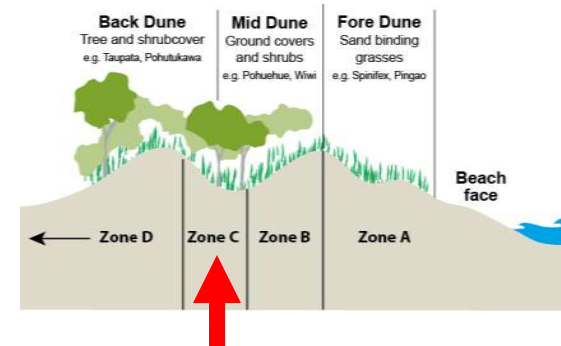
- What is the Zone C environment like for plants to live in?
 - Less hostile than Zones A and B!
 - Slightly less exposure to salt spray than Zones A and B.
 - Increasing amounts of organic matter and shelter from wind lifted by rising plant height provides some protection from salt-laden winds.



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Zone C – Mid-dune zone

- Characteristics of plants that live here:
 - Wider variety of plants inhabit this zone.
 - Plants are taller.
 - Many of these plants produce succulent berries and other seeds, providing a rich food source for birds, insects and lizards.

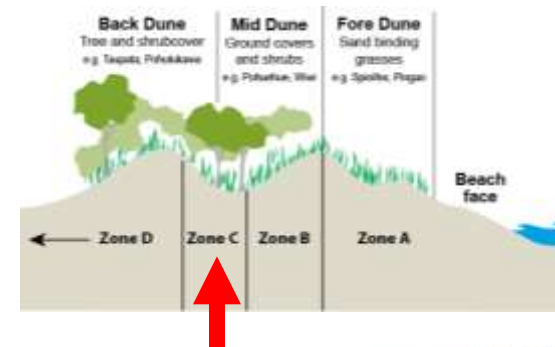


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Carex or Anawhata

Carex testacea [35cm]

- This very hardy and adaptable plant is frequently seen in reserves, traffic islands and increasingly in garden plantings.
- The flowing rich orange tussock-like foliage sways in the wind, and provides a very desirable appearance.

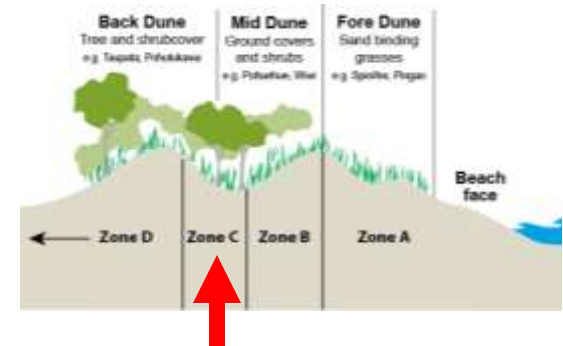


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Taupata

Coprosma repens [2-3m]

- The very shiny bright green leaves of this native plant are well known in many gardens globally.
- It now occurs only locally on our dunes, although it would have formerly been abundant.
- The numerous contrasting orange berries are attractive and great food for native birds and reptiles through summer/autumn.

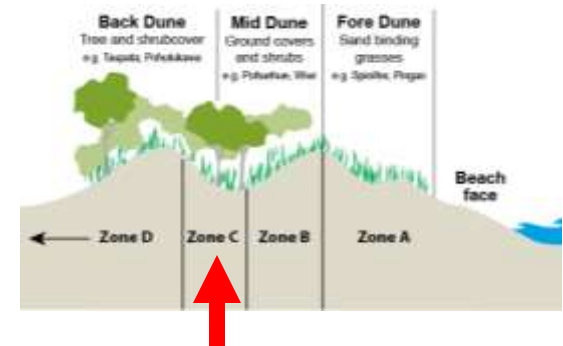


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Toetoe

Cortaderia fulvida [1m leaves, 3m flowers]

- Many people confuse this graceful native dune inhabiting plant with the invasive pampas grass.
- It is smaller, less common and more elegant than pampas, and does not have the large accumulation of dead leaves that burn easily or harbour rats.
- Flowers in spring/early summer, compared to autumn for pampas, and is not a weed threat.

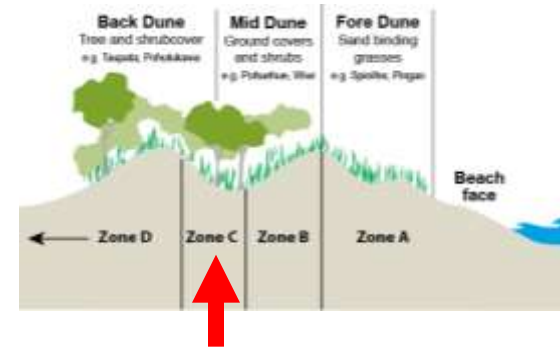


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Oioi, (jointed wire rush)

Apodasmia similis [90cm]

- Not a common plant on our dunes, preferring damp hollows.
- Abundant on estuary margins.
- The stems move gently in the wind (oioi = shake gently), and are coloured from soft green to rich orange, depending on the environment they grow in.

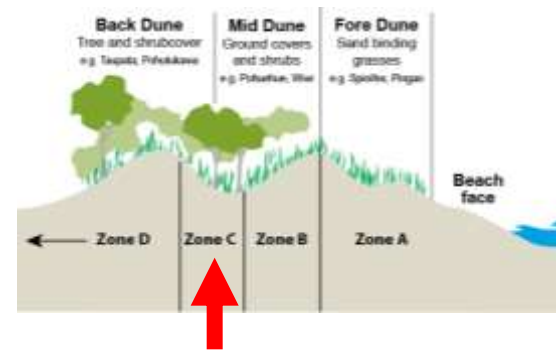


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Autetaranga, (sand daphne)

Pimelea arenaria [20cm]

- Only about six of these attractive plants remain on the mainland Bay of Plenty dunes, although greater numbers still occur on Matakana Island.
- Soft green foliage clothes this multi-stemmed low growing plant.
- They produce many small, orange centred, cream flowers in spring.

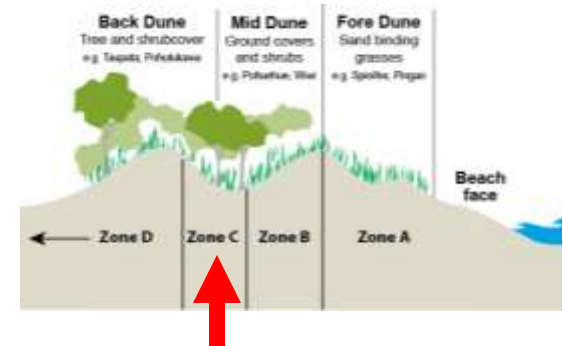


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Tī kōuka, (cabbage tree)

Cordyline australis [up to 12m]

- Often considered to be a plant of wetland margins, these also grow naturally on dunes.
- Copious flowers are intensely fragrant.
- Berries are great bird food.
- Views out to sea through their open attractive habit are quintessential New Zealand.

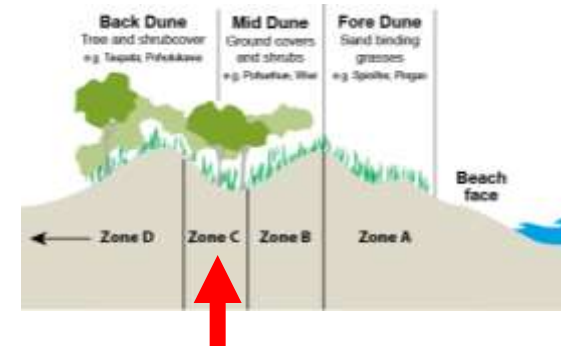


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Harakeke, (NZ flax)

Phormium tenax [leaves 2m, flowers 3m]

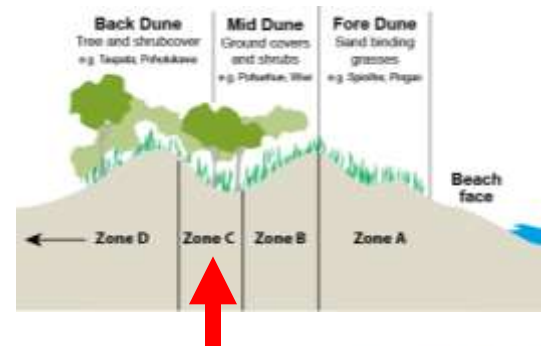
- Stiff upright leaves, and red flowers on tall stalks that attract nectar-feeding creatures like birds, lizards, and bees (including native bee species).
- Seed pods are black.
- Adaptable, but best planted in damper dune hollows.



Ngaio

Myoporum laetum [1m to 6m]

- Glossy, wavy, waxy, willow shaped leaves.
- The open habit makes it a good shade tree, and great for kids to climb.
- The 10mm white flowers with red or purple “freckles” attract many insects, and are followed by large numbers of small purple berries in autumn/winter.

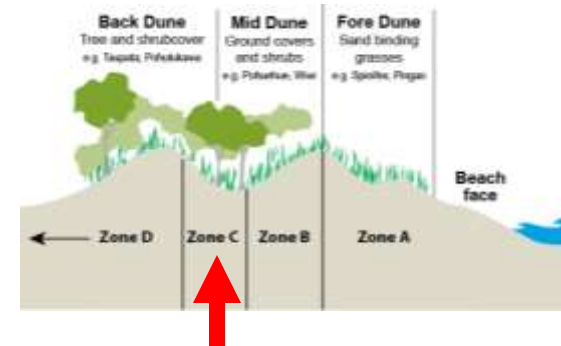


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Karo

Pittosporum crassifolium [2m to 5m]

- A popular small tree in gardens.
- Seeds spread by birds are resulting in natural establishment of seedlings in some dunes.
- Leaves are similar to pohutukawa.
- The deep crimson velvety flowers appear in early spring, with a delightfully sweet nocturnal scent.

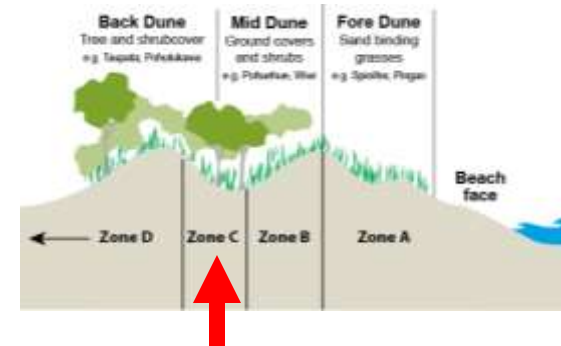


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Houpara, (coastal fivefinger)

Pseudopanax lessonii [2m to 5m]

- Leathery glossy leaves usually arranged in 3-5 “fingers”, with toothed edges.
- Quite versatile as it will grow in the open or under trees.
- Produces copious small black berries most of the year that are attractive to birds, making it self-seeding in dunes near existing specimens.



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Zone B plants can also be found in Zone C

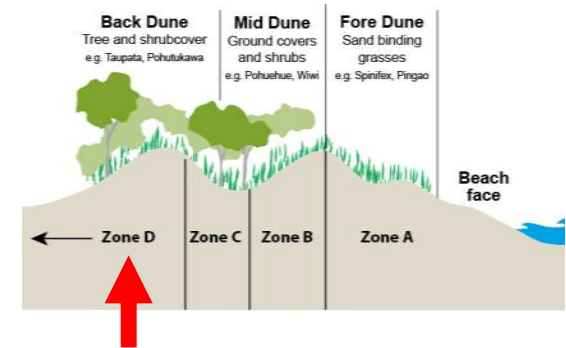
Tauhinu, wīwī, pohuehue, tarakupenga, perehia and kokihi plus;



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Zone D – Back-dune zone

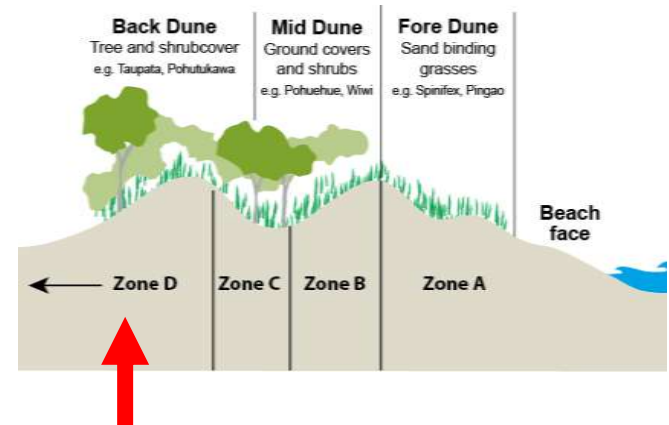
- What is the Zone D environment like for plants to live in?
 - Mature forest zone.
 - More organic matter in sand or shingle than previous zones.
 - Less exposure to salt spray than Zones A and B and C.
 - Better protection from onshore winds.



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Zone D – Back-dune zone

- Characteristics of plants that live here:
 - Forest plants.
 - Many plants are tall/trees.



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Zone D – all but disappeared!

- Zone D is also known as the **coastal forest** or **tertiary zone vegetation**.
- Composed of trees and shrubs, this zone represents the climax or mature state of natural coastal vegetation.
- This forest zone has disappeared from nearly all of our coastal dunes due to land development.

Zone D – all but disappeared!

- Many of these species can tolerate growing in Zones B and C but are in shrub form or stunted, due to excessive exposure to strong winds and salt spray.
- While many foredune and sandcover plants occur naturally, there are now only isolated pockets of coastal forest remaining due to clearing by fire, farming and subdivisions.

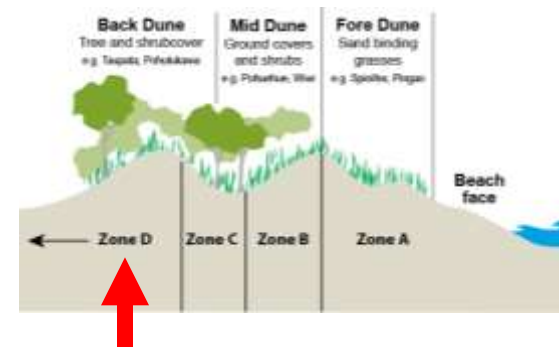
Zone C plants can also be found in Zone D

- Taupata, karamu, toetoe, tī kōuka, harakeke, ngaio, kawakawa, mahoe, akeake, hangehange, karo, houpara, pōhuehue, mapou and whauwhaupaku plus;

Wharangi

Melicope ternata [2m to 6m]

- Striking lime-green glossy and wavy leaves that have a lemon scent when crushed (it is related to citrus).
- The small green fragrant flowers in early spring (attractive to bees) mature to many shiny black seeds through spring/summer, contrasting nicely with the leaves.

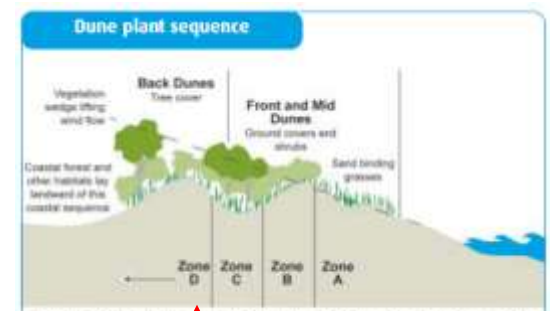


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Mānuka

Leptospermum scoparium [up to 2m]

- This plant is well known to gardeners, but again, is now very uncommon in our dune areas.
- Where it is found, it seems to favour open exposed sites where it is often wind-shorn.
- The numerous usually white flowers are produced over an extended period from spring to late autumn, providing a nectar source for a range of creatures.

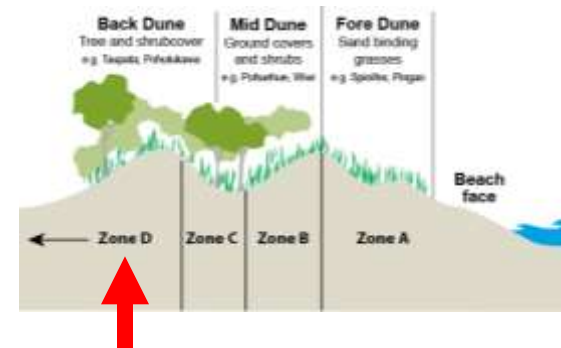


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Whau

Entelea arborescens [2m to 5m]

- The very large, distinctive, heart-shaped soft leaves up to 250mm long give this small tree a distinctly tropical appearance.
- The large clusters of yellow centred white flowers each up to 30mm across are very attractive, both to humans and insects.
- Only about 4-6 plants left on the Bay of Plenty dunes, probably as the leaves are relished by stock.

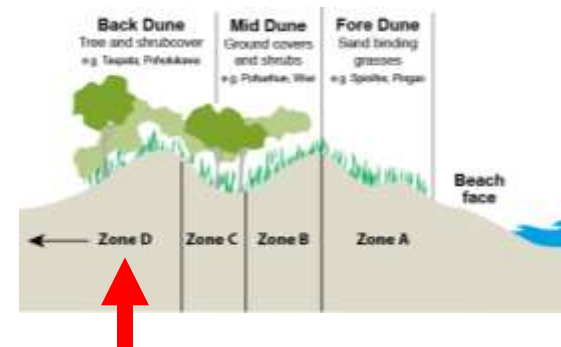


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Pōhutukawa

Metrosideros excelsa [3m to 20m]

- No Bay of Plenty beach is complete without these beautiful iconic trees.
- They can grow more seaward than this zone, and now cattle droving has stopped, seeds are germinating and growing naturally on rotting driftwood near dune crests (Zone B).
- The lower branches of tall trees can be trimmed for great views through them, and for people shade in hot summers.
- The bountiful, nectar-laden crimson flowers provide nutrition for vast numbers of native creatures, including lizards.

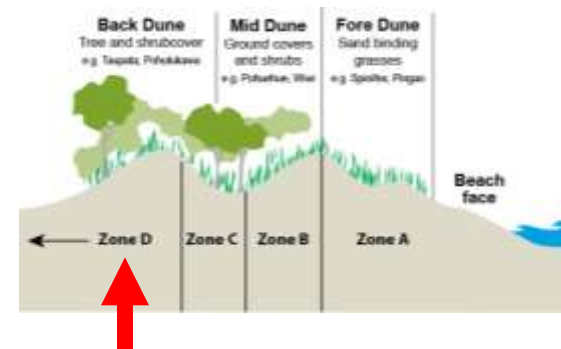


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Puriri

Vitex lucens [10m to 20m]

- The “food tree of the forest” is also locally common on parts of our coast.
- The shining dark green slightly “blistered” looking leaves provide a great contrast to the abundant 25mm long soft-red nectar-laden flowers produced through most of the year, as are the 20mm succulent (to birds) berries, hence the “food tree” name tag.

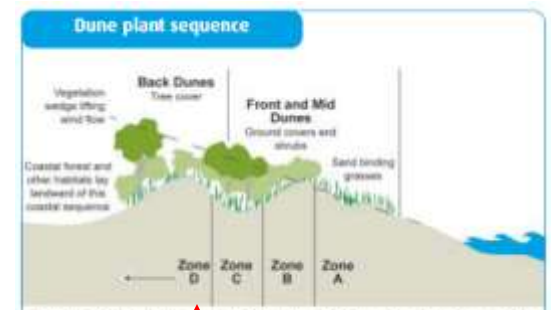


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Kohekohe

Dysoxylum spectabile [10m to 15m]

- The very large glossy leaves are made up of 3-4 pairs of leaflets.
- Long panicles of attractive flowers (up to 40cm long) are produced in autumn, emerging, unusually, directly from the trunk.
- Flowers are seldom seen however, as possums eat them voraciously.



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For more information contact:

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Bay of Plenty Regional Council in partnership with Tauranga City Council; Whakatane, Western Bay of Plenty, and Opotiki District Councils; and the Department of Conservation.