

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

Getting to know our sand dune community
(advanced)

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.
- In the Bay of Plenty region we have 3,000ha of coastal dune plants left compared with 12,000 ha pre human.
- 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 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, beach mining as well as weeds and pests.
- These disturbances have changed the stability of dunes, and sometimes resulted in dune degradation.

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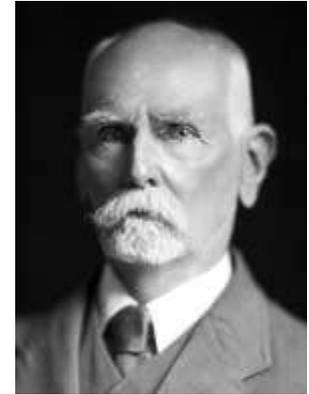
Do we need vegetation on the dunes?

- Introduced plant species (like marram grass and lupins) 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.

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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.
- An **Endemic** plant is also a native but lives nowhere except New Zealand.
- An **introduced** plant is one that people have brought to New Zealand. 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.

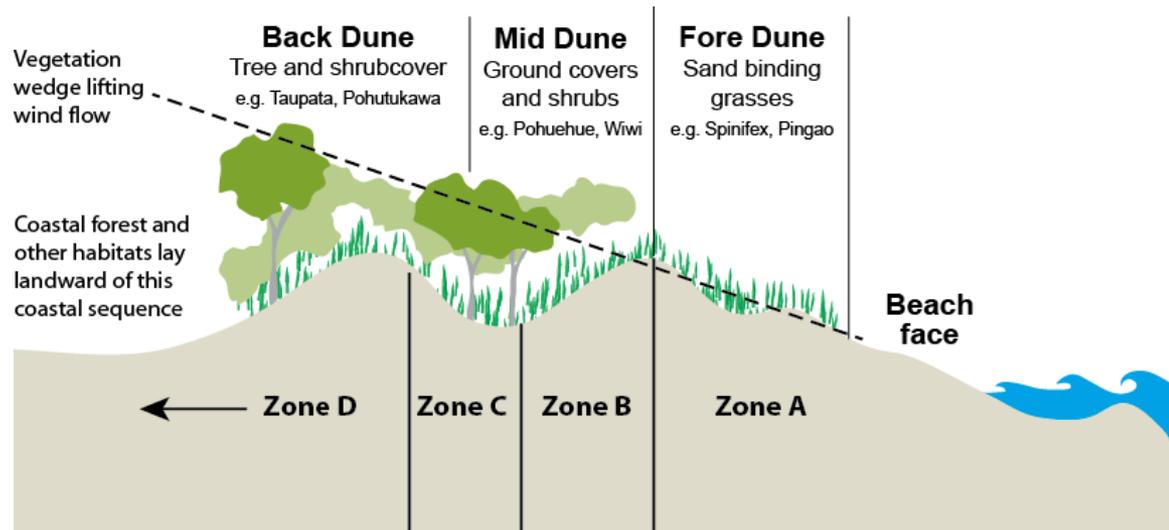


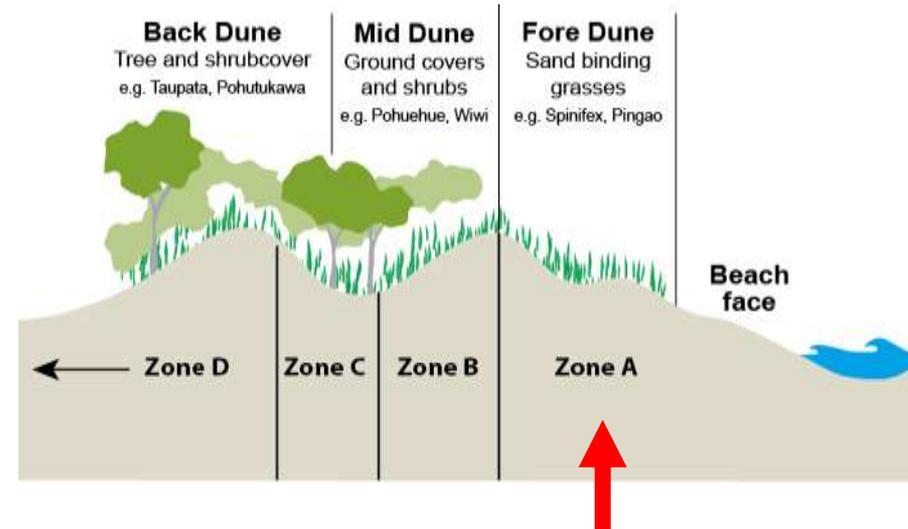
Diagram showing the vegetation sequence which probably characterised the most seaward coastal dunes of the Bay of Plenty region before human settlement.

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

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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.

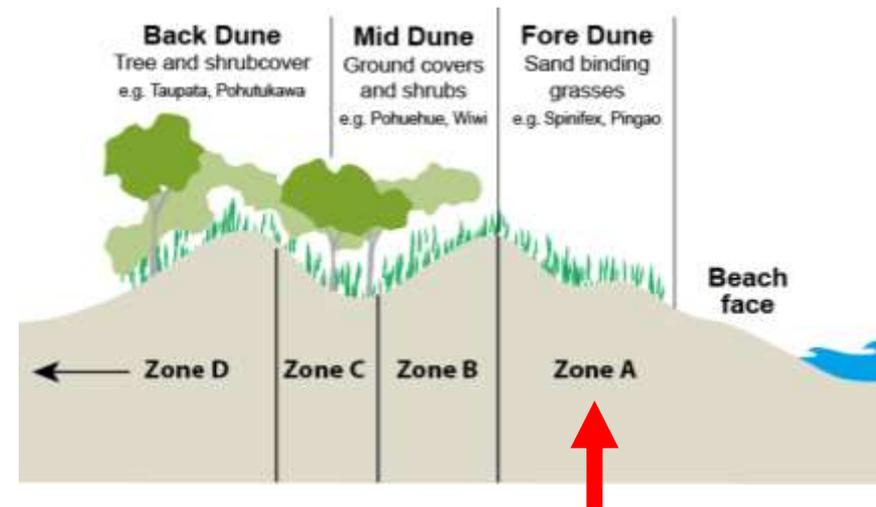


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Zone A – the closest to the sea

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 kōwhangatara or spinifex (Taken from Life's a beach video)

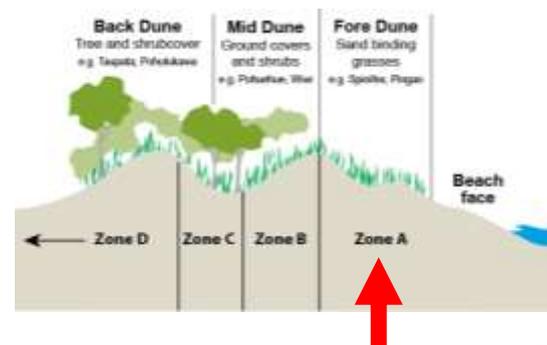
- Native dune grasses have a sparse yet rapid growth habit.
- Dune grasses slow and filter the wind, so sand drops out of the wind stream and builds up around the plant (in other words the sand accretes).
- Native sand binders build smooth, gently sloping aerodynamic dunes.

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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.
- In ideal conditions it can grow over 5m per year

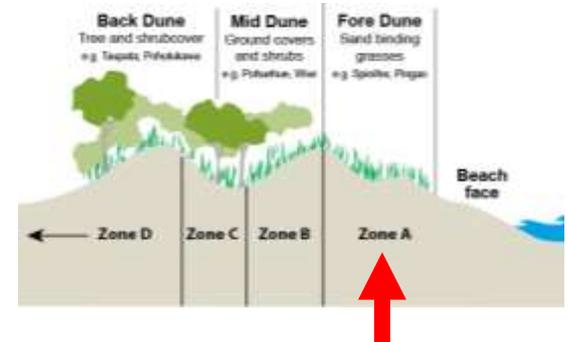


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Pīngao

Ficinia spiralis [80cm]

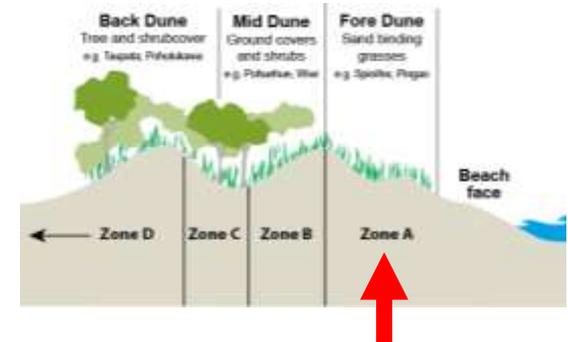
- This bronze-green sedge turns golden-orange in winter.
- A very efficient sand trapper with runners like spinifex, but is readily damaged by grazing, and trampling.
- Mature plants have leaves which dry to a beautiful gold colour. They can be harvested sustainably for weaving and used in tukutuku panels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



Hinarepe (sand tussock)

Poa billardierei [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.
- Coast Care volunteers have planted many over the last ten years.



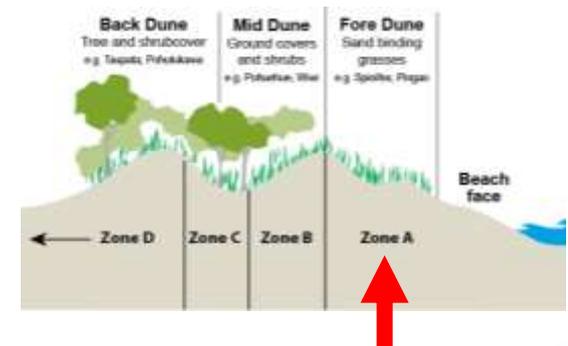
Nihinihi (shore bindweed)

Calystegia soldanella [10cm]

- This is a common low-growing plant on many beaches, with attractive bright green shiny leaves.
- It has showy striped lilac and white flowers about 40 to 75mm across through summer.
- Leaves die down in winter (i.e. it is an herbaceous perennial).
- It produces abundant seed.



Photo: www.nzpcn.org.nz photographer: John Barkla



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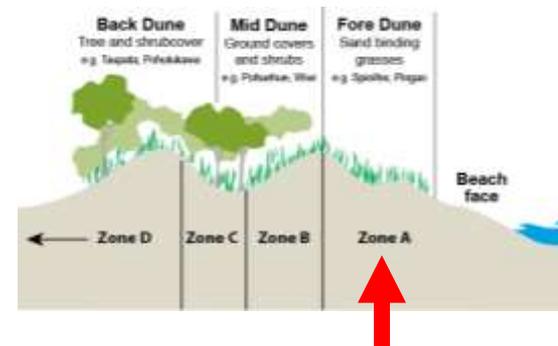
Carex

Carex pumila [10cm]

- A small creeping blue-green sedge that occurs locally, generally only on damp sites, or next to small streams.



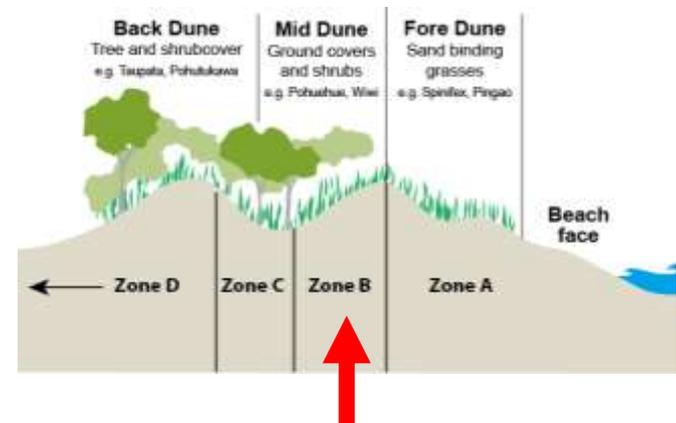
Image www.nzpcn.org.nz photographer: Jeremy Rolfe



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Zone B – land side of the first dune crest

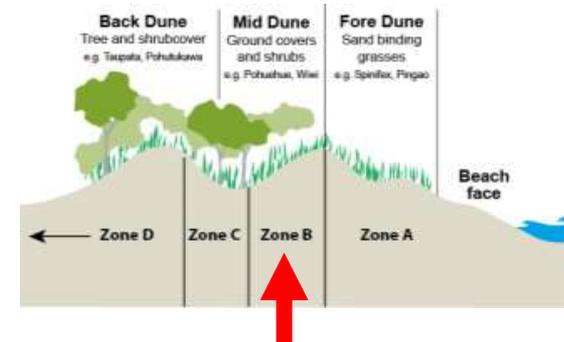
- What is the Zone B environment like for plants to live in?
 - Slightly less hostile than Zone A!
 - Some protection from wild storms with strong winds.
 - Exposure to salt spray.
 - Less sand movement.
 - Some organic matter and nutrients.
 - Usually facing away from the sea.



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Zone B

- 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.

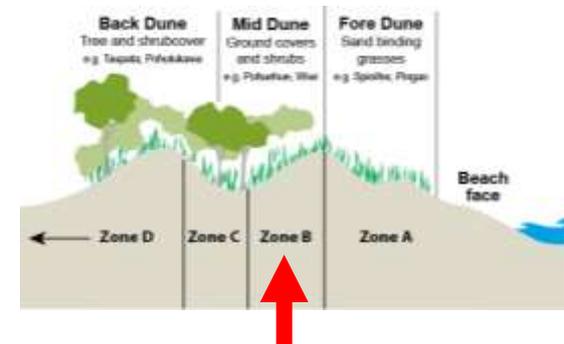


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Tauhinu

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.
- In some parts of New Zealand it has been treated as a pest plant on farmland.

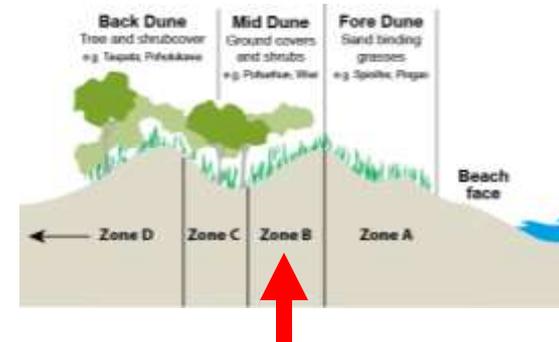


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Wīwī, (knobby clubrush)

Ficinia 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.
- The easiest mid or back dune plant to establish.



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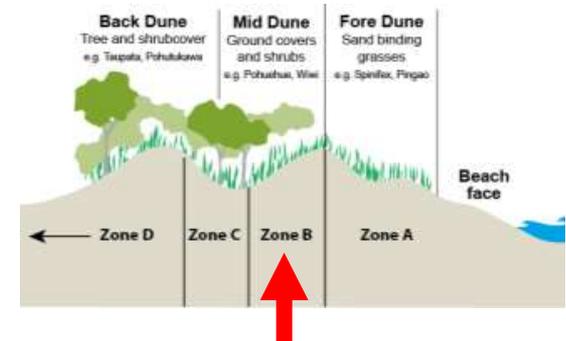
Pohuehue, (wire vine)

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.



Image: www.nzpcn.org.nz Photographer: Peter de Lange

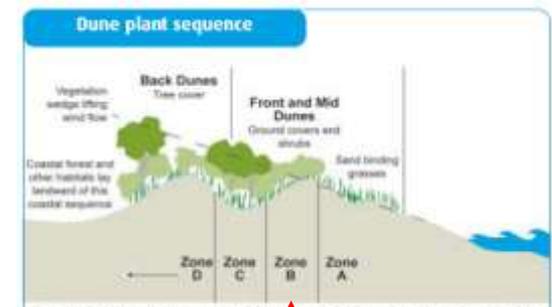


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Horokaka (NZ ice plant)

Disphyma australe [15cm]

- This species is now uncommon on our dunes.
- The typically fleshy leaves are much smaller than those of the more common introduced ice plant.
- Flowers are very showy and abundant right through summer, about 50 to 70mm across, and either cream or pink.
- Sometimes it's confused with the introduced South African ice plant

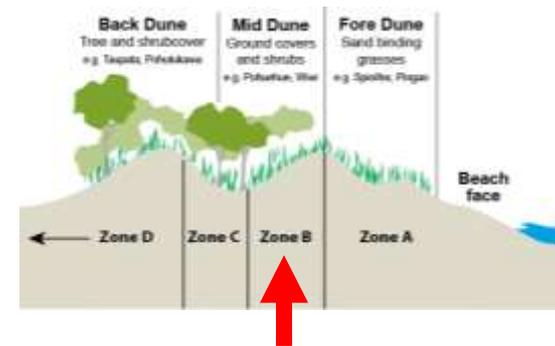


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Tarakupenga (sand coprosma)

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 due to stock and rabbits.



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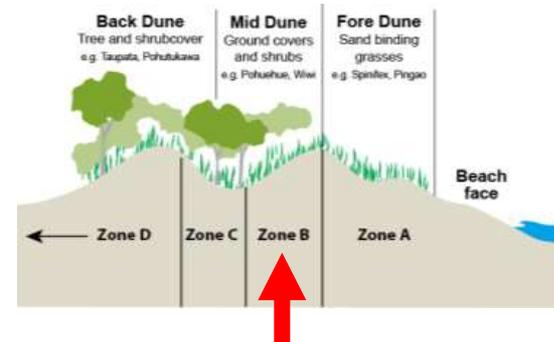
Perehia (sand wind grass)

Lachnagrostis billardierei [40cm]

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



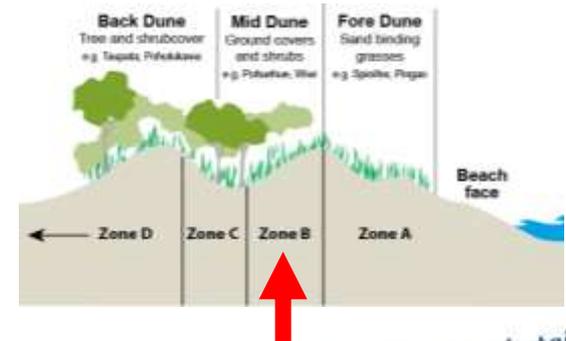
Image: www.nzpcn.org.nz Photographer: Robyn Smith



Tutae koau (shore celery)

Apium prostratum [40cm]

- Occurs rarely at scattered sites in the Bay of Plenty.
- This is a very tasty edible plant (like a mixture of salted celery and parsley), which probably explains its rarity.
- Flourishes in damp shady places, but is also growing naturally in full sun on a sandy beach near Te Kaha.
- Also grows on rocky slopes especially near seeps.

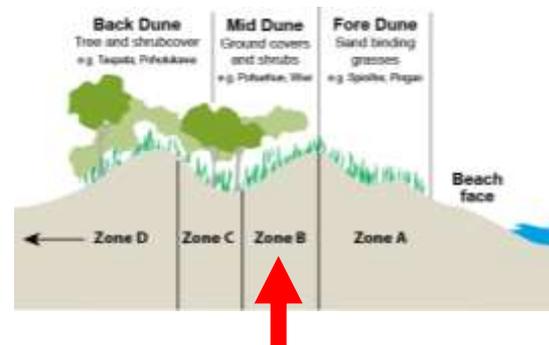


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Kokihi (beach spinach and NZ spinach)

Tetragonia trigyna and *tetragonoides* [10cm]

- Both species have edible dark green fleshy leaves (much larger on NZ Spinach).
- Stems often have a red blush, which along with the small yellow flowers and red berries provide good colour among other dune plants.
- Found only occasionally in the Bay of Plenty especially Waihi Beach.

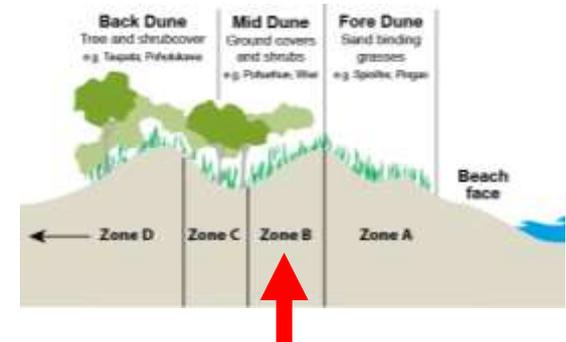


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Waiū-o-kahukura (shore spurge)

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.
- This plant is difficult to establish



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Zone A plants can also be found in Zone B



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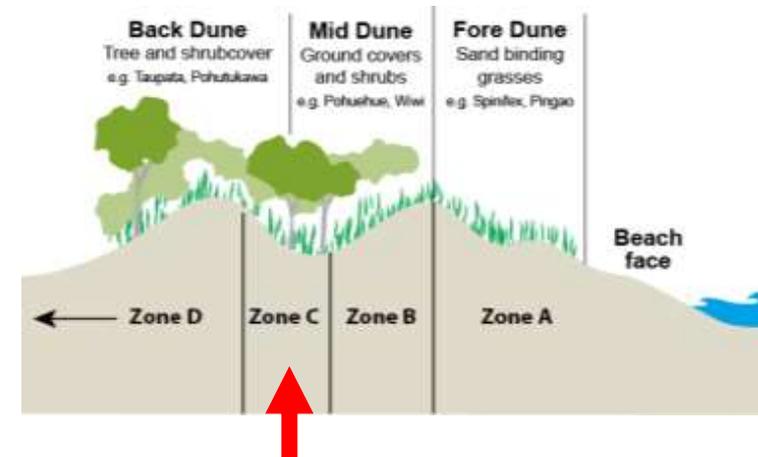
Zone C – Mid-dune zone

- 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 nutrients
 - More shelter from wind.
 - Higher moisture levels.
 - Can reach very high temperatures due to lower wind speed

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.
- This area is more prone to weed invasion than zones A and B.

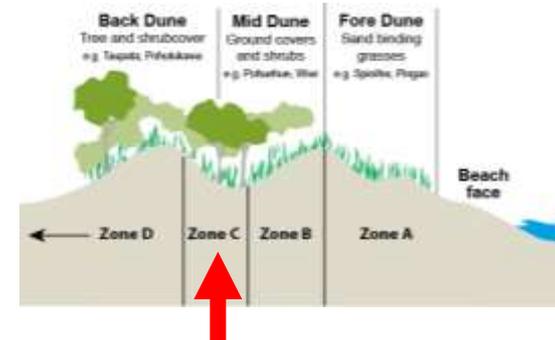


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Carex or Anawhata

Carex testacea [35cm]

- This very hardy and adaptable sedge 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.

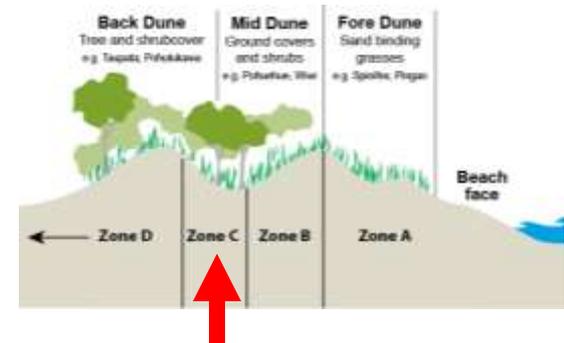


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Taupata

Coprosma repens [2-3m]

- It now occurs only locally on our dunes due to stock and rabbits.
- The numerous contrasting orange berries are attractive and great food for native birds and reptiles through summer/autumn.
- It is one of the most salt tolerant shrubs.
- Relatively easy to establish when rabbits are under control.

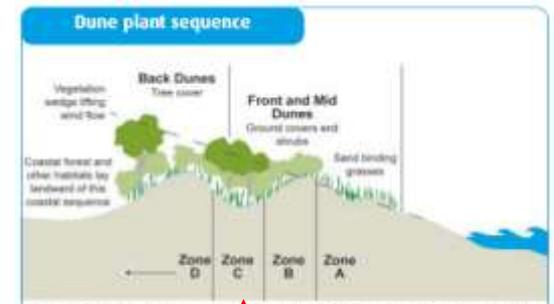


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Karamu

Coprosma robusta [3-5m]

- Very similar in growth habit to taupata, but with more pointed and less shiny leaves.
- Berry production is similar, making it another valuable food source for native creatures.

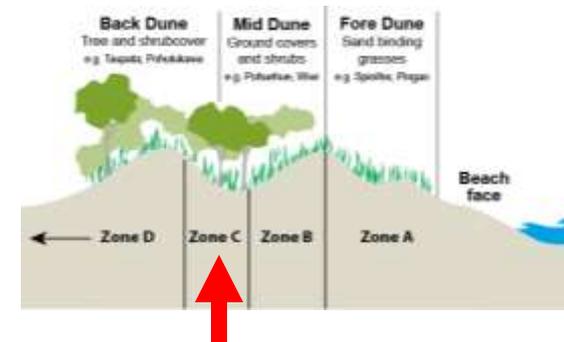


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Toetoe

Cortaderia fulvida [1m leaves, 3m flowers]

- Tall native grass, flowers in spring/early summer.
- Many people confuse this native dune plant with the invasive pampas grass.
- It is smaller and less common than pampas.

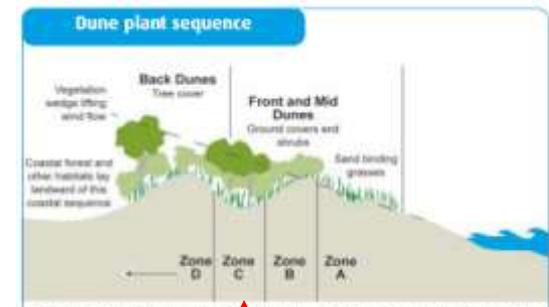


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Oioi (jointed wire rush)

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.

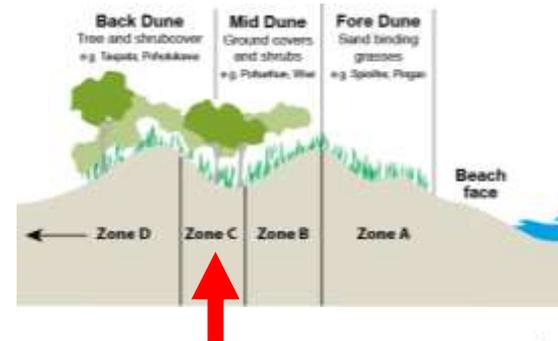


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Autetaranga (sand daphne)

Pimelea villosa [20cm]

- Only five of these plants are naturally occurring 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.
- Coast Care volunteers have planted many over the last ten years.

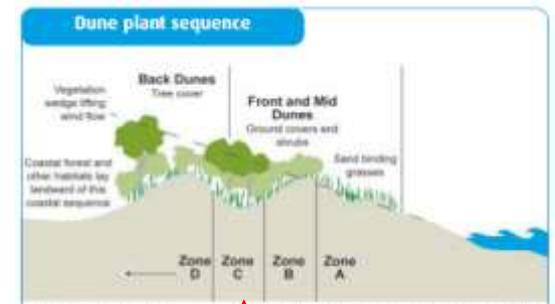


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Tī kōuka, (cabbage tree)

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.

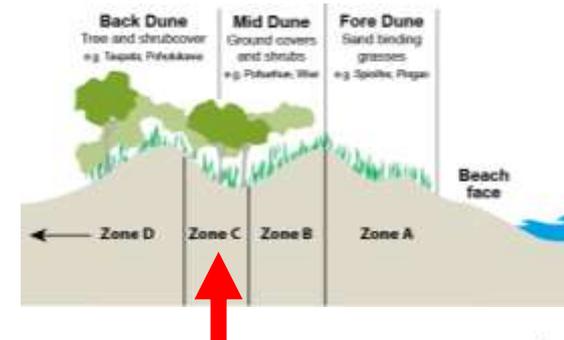


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Harakeke, (NZ flax and coastal flax)

Phormium tenax and *Phormium cookianum* [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.

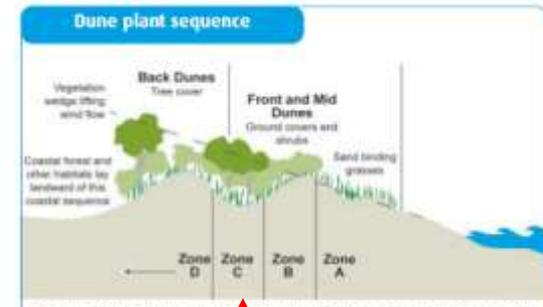


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Ngaio

Myoporum laetum [1m to 6m]

- Glossy, wavy, waxy, willow shaped leaves.
- The open habit makes it a good shade tree, and is easy to establish
- 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.
- Sometimes it’s confused with the introduced Tasmanian Ngaio.

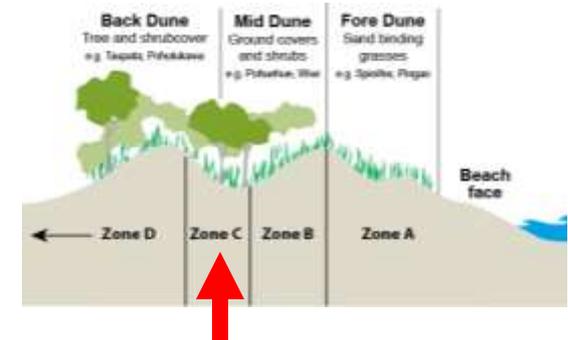


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Coastal mahoe

Meliccytus novaezelandiae [1m to 2.5m]

- Leathery olive green leaves are an unusual colour for native plants, as is the multi-stemmed upright growth habit.
- Profuse small purple berries along the stems through autumn/winter.
- This species disappeared from many areas due to stock and rabbits but is now making a come back.
- Healthy populations are now found at Mount Maunganui and Thornton.

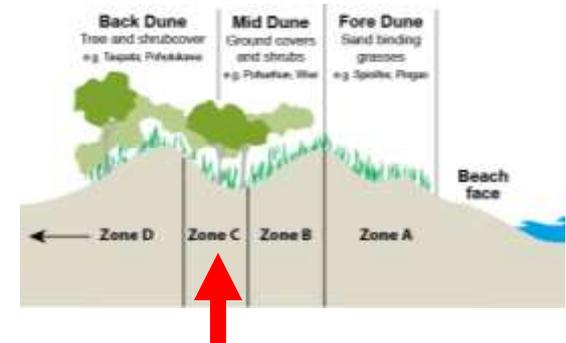


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Akeake

Dodonaea viscosa [1m to 4m]

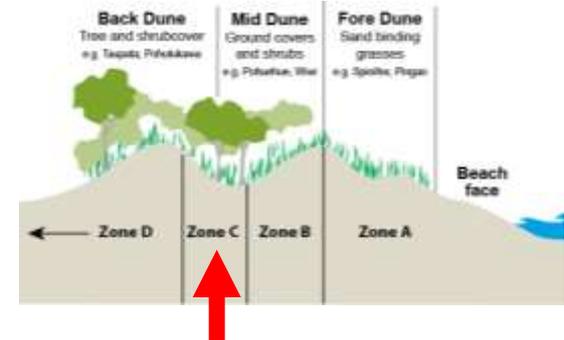
- Now uncommon on local dunes, and only the green-leaved form is indigenous here.
- The willow-shaped leaves are thin but with a rough surface, and almost glow when backlit.
- The light green winged seeds make a nice colour contrast to the leaves.



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 pōhutukawa.
- The deep crimson velvety flowers appear in early spring, with a delightfully sweet nocturnal scent.

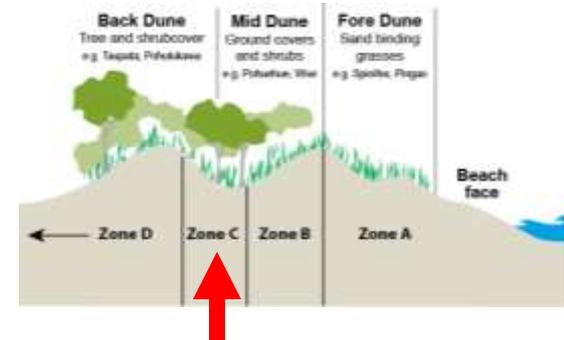


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Houpara (coastal fivefinger)

Pseudopanax lessonii [2m to 5m]

- Thick glossy leaves usually arranged in 3-5 “fingers”, with toothed edges.
- 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.



Zone B plants can also be found in Zone C

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

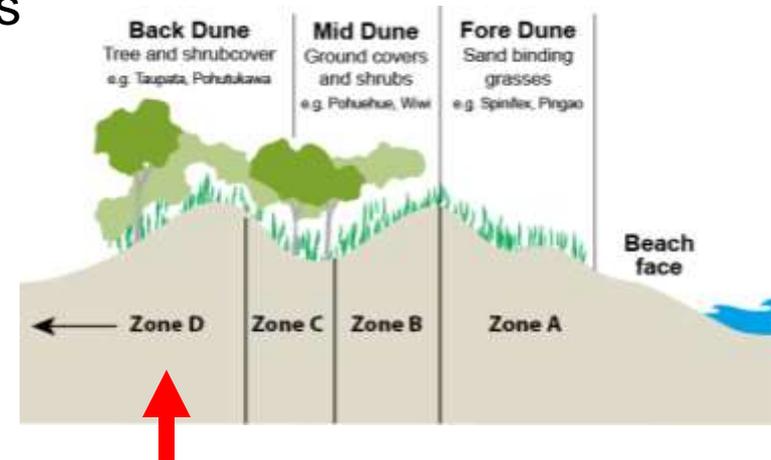


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Zone D – Back-dune zone

What is the Zone D environment like for plants to live in?

- Mature coastal forest zone.
- More fertile soil - more organic matter and nutrients than previous zones, and moisture retention.
- Less exposure to salt spray than Zones A and B and C.
- Better protection from onshore winds



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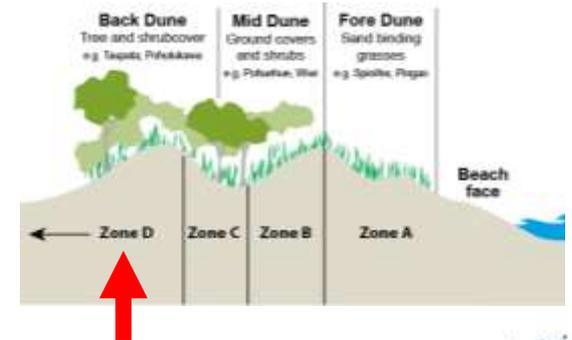
Zone D – all but disappeared!

- 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.

Mānuka

Leptospermum scoparium [up to 2m]

- This plant is well known to gardeners, but is now very uncommon in our dune areas.
- It seems to favour open exposed or rocky 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.

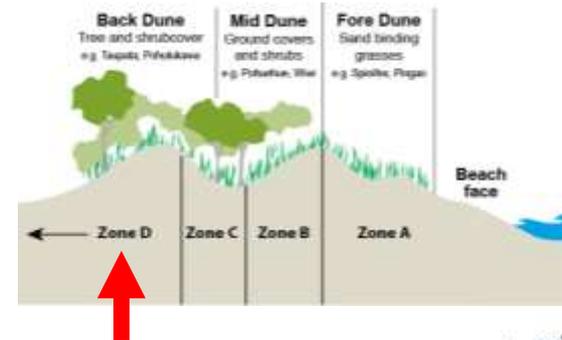


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Kanuka

Kunzea ericoides [up to 12m]

- The small aromatic leaves and profuse small white flowers (which attract many insects, especially native bees) are smaller than mānuka, although the tree itself is many times larger, with stout trunks and branches.
- Very rarely found on dunes now, and where exposed to the elements remain very stunted, often only 1 or 2m high (e.g. Torere Beach).

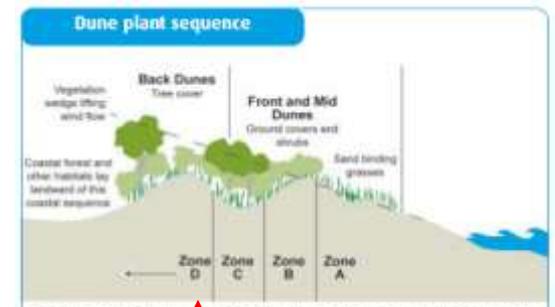


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Kanuka (thornton)

Kunzea species (unnamed) [up to 6m]

- This kanuka, indigenous to the Thornton area, is nationally unique and specific to this 20km of dune.
- The candelabra, bonsai-style form persists even when grown inland, and so is now recognised as a separate species, as yet unnamed.
- This *Kunzea* species should only be planted along the dunes adjacent to the Rangitaiki Plains, as it does not occur naturally anywhere on mainland New Zealand outside this geographical area.

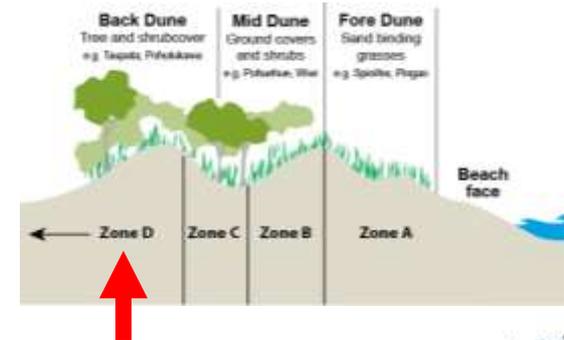


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Whau

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 eaten by stock.

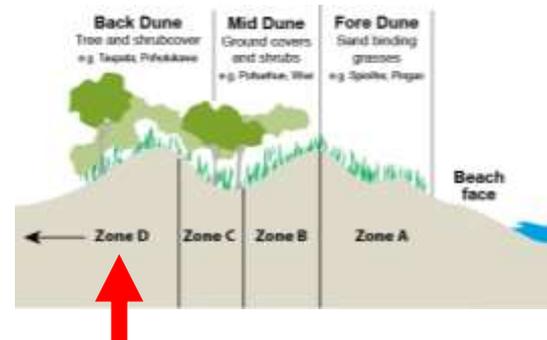


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Pōhutukawa

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 nectar-laden crimson flowers provide nutrition for vast numbers of native creatures, including lizards.

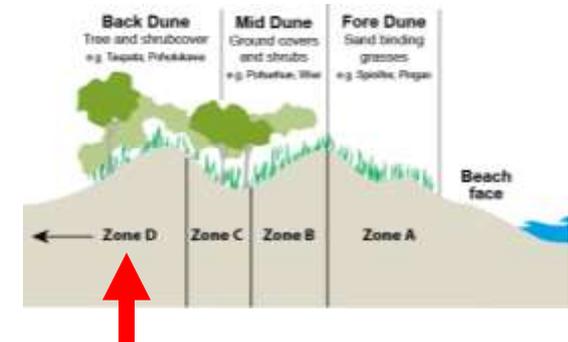


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Pūriri

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.

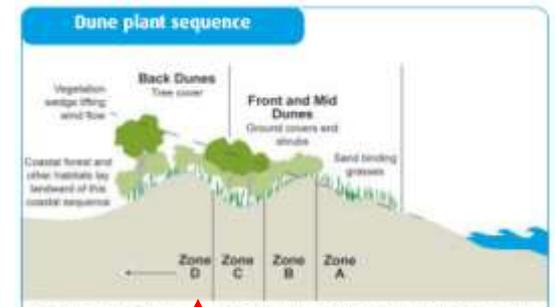


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Karaka

Corynocarpus laevigatus [10m to 15m]

- Glossy, thick dark green leaves provide a great contrast to the large bright orange berries in summer/autumn (with poisonous kernels).
- A round-headed tree which looks similar to a large magnolia.
- The leaves are reasonably salt tolerant.

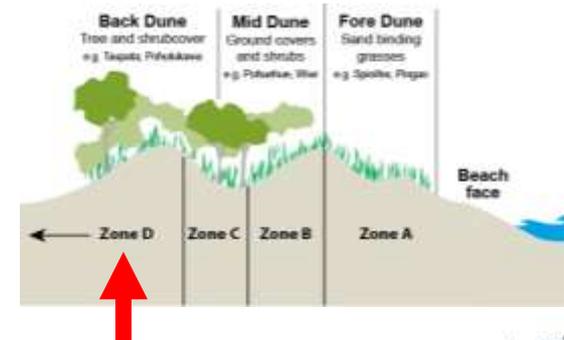


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Kohekohe

Dysoxylum spectabile [10m to 15m]

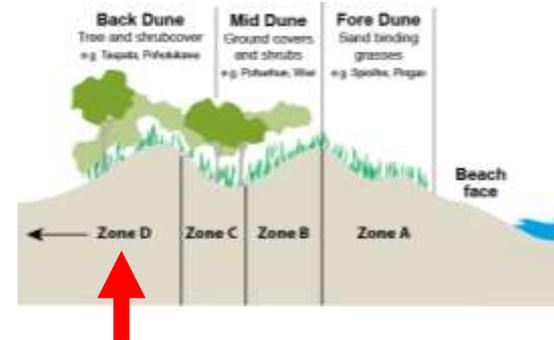
- The very large glossy leaves are made up of 3-4 pairs of leaflets.
- Long panicles of attractive flowers (up to 40cm long) are produced in autumn, emerging, unusually, directly from the trunk.
- Flowers are seldom seen however, as possums eat them voraciously.



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Koromiko *Hebe stricta* [1.2m]

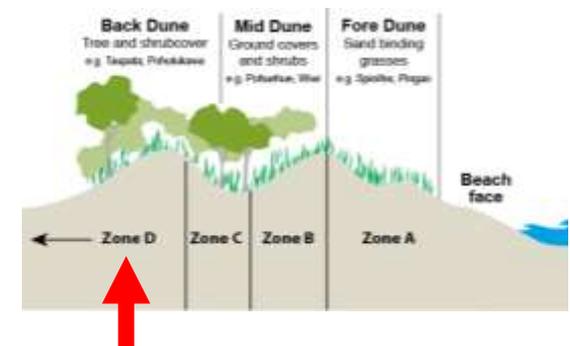
- The long soft green leaves with a toothed margin, and abundant soft blue/white flowers make this a great addition to any landscape.
- Few now remain in our dunes.



Wharangi

Melicope ternata [2m to 6m]

- Lime-green glossy and wavy three fingered 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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Zone C plants can also be found in Zone D

- Taupata, toetoe, tī kōuka, harakeke, ngaio, kawakawa, mahoe, akeake, karo, houpara, pohuehue.



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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.